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UK METEOROLOGICAL OFFICE GLOBAL DATA MONITORING REPORT

October, 93

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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis. The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background field). Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1-2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIBU observations received per day throughout the month at Bracknell and assimilated into model runs. Only data from the main hours of 00 UTC, 06 UTC, 12 UTC and 18 UTC are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Aircraft observations

TABLE 3 contains a list of statistics calculated from data received from all airline carriers.

Figure 3 shows 10 degree lat/long box average numbers of AIREP/ASDAR reports received per day throughout the month at Bracknell and assimilated into model runs in the layer 70-500 hPa. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4-7 show wind statistics for AIREP/ASDAR in the layer 70-500 hPa. Observations with a vector wind difference > 60 $m\ s^{-1}$ have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed ($m\ s^{-1}$)
7	RMS observation-background vector ($m\ s^{-1}$)

Radiosonde Observations

TABLES 4-6 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 4 and 5 and the weights used in the RMS values in TABLE 4.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-27 show satellite mean observation-background temperature differences for NOAA-11 soundings at 500 km resolution and figures 28-30 show the same statistics for NOAA-12. Data are plotted where there are > 30 observations in a 10 degree lat/long box.

Figure	Layer (hPa)
25/28	850-1000
26/29	100-300
27/30	30-50

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH:October, 93

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from Bracknell global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed ($m\ s^{-1}$).
:Wind direction (Degrees).

Parameters monitored :NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 $m\ s^{-1}$ (vector wind)

SELECTION CRITERIA :NOBS $\geq$ 20 ,and one or more of the following:

1.|bias| $\geq$ 4 hPa (pressure),
$\geq$ 5 $m\ s^{-1}$ (wind speed)
$\geq$ 30 degrees (direction).

2.SD $\geq$ 6 hPa (pressure)
$\geq$ 80 degrees (direction).

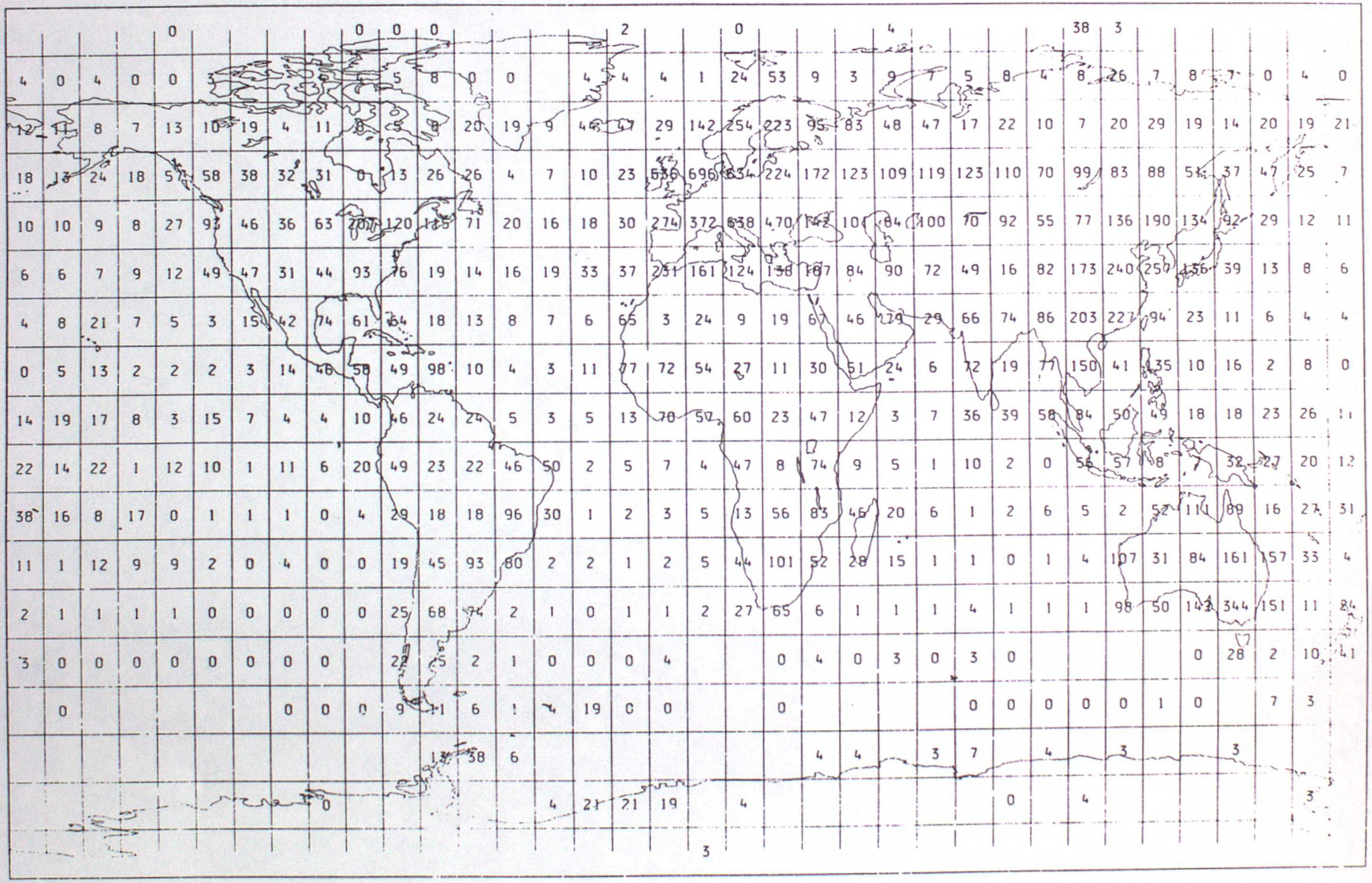
3.PGE $\geq$ 25.

IDENTIFIER	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
A8MF	ALL	MSLP	SUR	23	0	0	1.1	-4.3	4.4
CFD3659	ALL	MSLP	SUR	94	1	1	3.7	4.3	5.7
CG2845	ALL	MSLP	SUR	31	0	0	2.8	-5.3	6.0
C6BT8	ALL	MSLP	SUR	48	0	0	1.4	5.2	5.3
ELFN7	ALL	MSLP	SUR	43	0	0	1.5	4.4	4.6
ELPP9	ALL	MSLP	SUR	43	0	0	2.1	-4.3	4.8
EOGP	ALL	MSLP	SUR	30	0	0	1.8	9.5	9.6
ESXD	ALL	MSLP	SUR	35	1	3	1.9	11.5	11.6
EUOC	ALL	MSLP	SUR	35	9	26	2.8	-2.4	3.7
EWBT	ALL	MSLP	SUR	23	14	61	6.7	5.6	8.7
UFXV	ALL	MSLP	SUR	34	32	94	0.1	2.6	2.6
UKTV	ALL	MSLP	SUR	28	0	0	2.3	5.1	5.6
ULDZ	ALL	MSLP	SUR	26	0	0	1.1	9.2	9.2
USWZ	ALL	MSLP	SUR	20	5	25	6.9	3.0	7.6
UUJV	ALL	MSLP	SUR	50	3	6	1.2	-6.3	6.5
UUST	ALL	MSLP	SUR	62	31	50	1.5	0.2	1.6
UYJL	ALL	MSLP	SUR	29	0	0	2.1	-5.0	5.4
VOCG	ALL	MSLP	SUR	27	11	41	3.9	-7.5	8.4
VRMQ	ALL	MSLP	SUR	33	0	0	2.6	-4.2	4.9
WC5932	ALL	MSLP	SUR	43	0	0	4.3	-4.3	6.1
WE3806	ALL	MSLP	SUR	51	1	2	2.1	-4.6	5.1
WE4879	ALL	MSLP	SUR	37	0	0	2.3	-4.0	4.6
WTC9408	ALL	MSLP	SUR	21	1	5	1.7	4.6	4.9
WZE4928	ALL	MSLP	SUR	61	61	100	0.0	0.0	0.0
ZCAM9	ALL	MSLP	SUR	55	0	0	2.6	4.4	5.1
3FGH3	ALL	MSLP	SUR	25	0	0	1.6	-4.2	4.5
3FJJ3	ALL	MSLP	SUR	24	0	0	3.7	-10.5	11.2
WIND SPEED									
LAPP2	ALL	SPEED	SUR	35	0	0	2.4	5.2	5.7
LBHA	ALL	SPEED	SUR	20	0	0	4.1	5.1	6.5
VRSM	ALL	SPEED	SUR	42	0	0	5.3	10.2	11.5
VTKW	ALL	SPEED	SUR	24	0	0	3.7	5.4	6.5
3EEZ7	ALL	SPEED	SUR	21	0	0	5.7	6.7	8.8
3EUU6	ALL	SPEED	SUR	31	0	0	3.3	5.0	6.0
9310	ALL	SPEED	SUR	37	0	0	5.5	5.3	7.6
WIND DIRECTION									
DUPV	ALL	DIRN.	SUR	27	0	0	21.4	38.9	44.4
ELFN7	ALL	DIRN.	SUR	32	0	0	67.8	46.8	82.4
NAMW	ALL	DIRN.	SUR	25	1	4	85.0	8.8	85.5
UUNU	ALL	DIRN.	SUR	26	0	0	39.9	-34.0	52.5
46147	ALL	DIRN.	SUR	72	0	0	35.4	-30.9	47.0

AVAILABILITY - SHIP/SYNOP - OCTOBER 1993

FIGURE 1

MAIN HOURS ONLY
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 19753



				0					0	0	0					2			0				4					38	3						
4	0	4	0	0	3			[illegible]	4	5	8	0	0		4	4	4	1	24	53	9	3	9	7	5	8	4	8	26	7	8	7	0	4	0
12	11	8	7	13	10	19	4	11	8	5	8	20	19	9	44	47	29	142	254	223	95	83	48	47	17	22	10	7	20	29	19	14	20	19	21
18	13	24	18	57	58	38	32	31	0	13	26	26	4	7	10	23	536	696	634	224	172	123	109	119	123	110	70	99	83	88	54	37	47	25	7
10	10	9	8	27	93	46	36	63	207	120	115	71	20	16	18	30	274	372	638	470	142	104	84	100	70	92	55	77	136	190	134	92	29	12	11
6	6	7	9	12	49	47	31	44	93	76	19	14	16	19	33	37	231	161	124	138	187	84	90	72	49	16	82	173	240	257	136	39	13	8	6
4	8	21	7	5	3	15	42	74	61	64	18	13	8	7	6	65	3	24	9	19	67	46	179	29	66	74	86	203	227	94	23	11	6	4	4
0	5	13	2	2	2	3	14	46	58	49	98	10	4	3	11	77	72	54	27	11	30	51	24	6	72	19	77	150	41	135	10	16	2	8	0
14	19	17	8	3	15	7	4	4	10	46	24	24	5	3	5	13	70	57	60	23	47	12	3	7	36	39	58	84	50	49	18	18	23	26	11
22	14	22	1	12	10	1	11	6	20	49	23	22	46	50	2	5	7	4	47	8	74	9	5	1	10	2	0	56	57	8	7	32	27	20	12
38	16	8	17	0	1	1	1	0	4	29	18	18	96	30	1	2	3	5	13	56	83	46	20	6	1	2	6	5	2	52	111	89	16	27	31
11	1	12	9	9	2	0	4	0	0	19	45	93	80	2	2	1	2	5	44	101	52	28	15	1	1	0	1	4	107	31	84	161	157	33	4
2	1	1	1	1	0	0	0	0	0	25	68	74	2	1	0	1	1	2	27	65	6	1	1	1	4	1	1	1	98	50	143	344	151	11	24
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	0						0	0	0	9	11	6	1	4	19	0	0			0					0	0	0	0	0	1	0		7	3	
											13	38	6								4	4		3	7		4		3			3			
								0						4	21	21	19		4							0		4						3	
																		3																	

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH:October, 93

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoys.

Standard of comparison :Background field from Bracknell global model.

Position :Average Latitude and Longitude for period.

Observation times :00, 06, 12, 18 UTC

Elements monitored
:Mean sea level pressure (hPa)
:Wind speed (m s^{-1}),
:Wind direction (degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 m s^{-1} (vector wind)

SELECTION CRITERIA :NOBS ≥ 20 ,and one or more of the following:

1. |bias| ≥ 4 hPa (pressure).
   ≥ 5 m s^{-1} (wind speed).
   ≥ 30 degrees (direction).

2. SD ≥ 6 hPa (pressure).
   ≥ 80 degrees (direction).

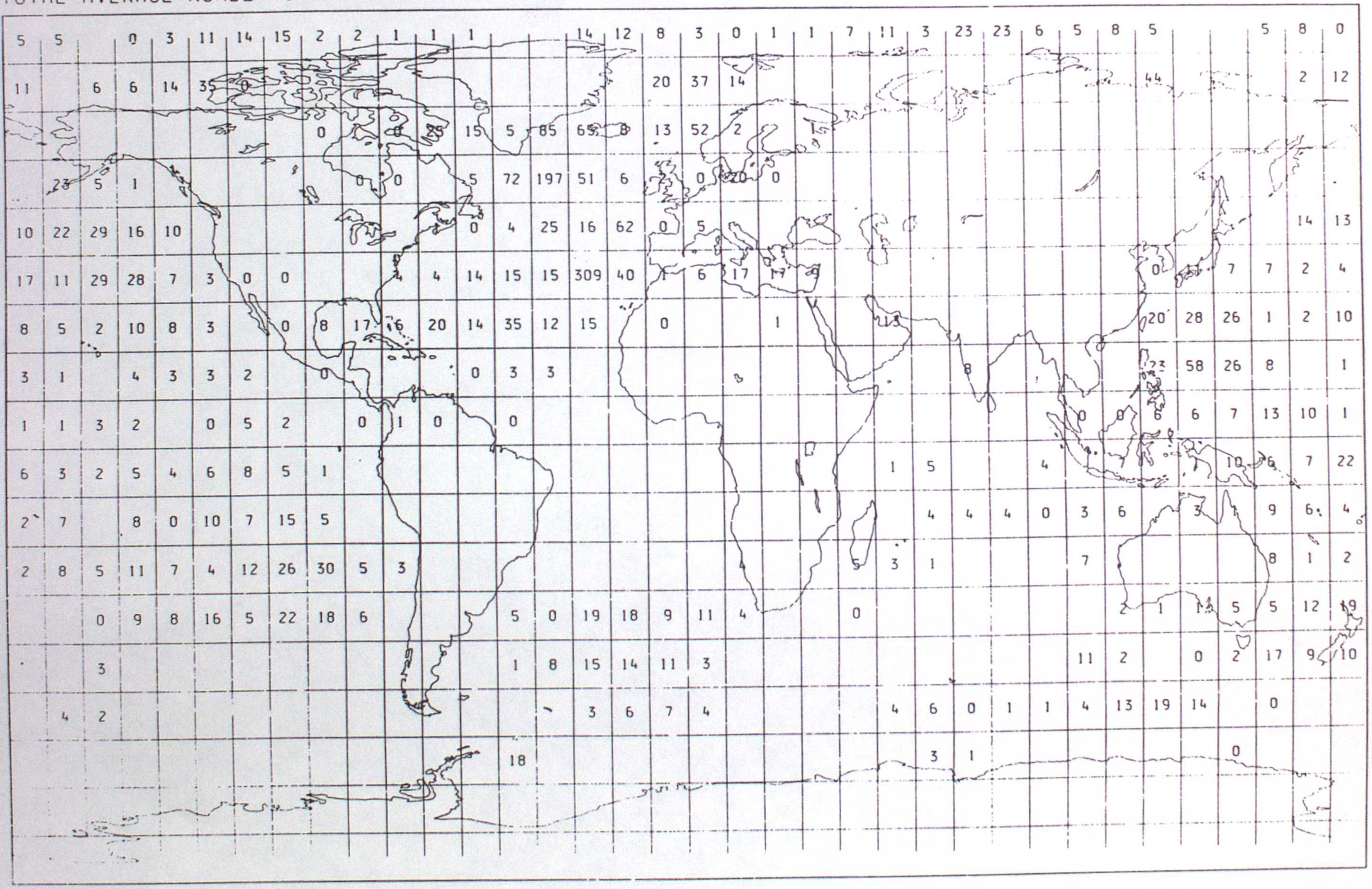
3. PGE ≥ 25.

IDENTIFIER	LAT.	LONG.	HOUR	ELEM	LEVEL	NOBS	NGE	PGE	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE											
12501	37.8	9.3	ALL	MSLP	SUR	274	205	75	1.2	-2.0	2.4
12507	38.9	-77.2	ALL	MSLP	SUR	34	34	100	0.0	0.0	0.0
17815	-52.3	61.2	ALL	MSLP	SUR	322	1	0	6.0	-0.6	6.0
46662	48.1	-150.0	ALL	MSLP	SUR	52	13	25	4.7	3.4	5.8
61530	31.0	17.5	ALL	MSLP	SUR	82	1	1	4.9	-4.4	6.6
71003	-79.0	-28.0	ALL	MSLP	SUR	509	509	100	0.0	0.0	0.0
74002	-72.1	-2.5	ALL	MSLP	SUR	443	118	27	2.1	-11.7	11.9
WIND SPEED											
44777	50.5	-30.6	ALL	SPEED	SUR	111	1	1	4.1	-9.7	10.5
44778	56.6	-38.9	ALL	SPEED	SUR	248	0	0	3.2	-9.3	9.9
44779	53.2	-35.8	ALL	SPEED	SUR	165	0	0	4.5	-9.1	10.2
55583	-36.9	170.7	ALL	SPEED	SUR	278	0	0	2.1	-5.9	6.2
56513	-15.2	80.3	ALL	SPEED	SUR	222	0	0	1.9	-6.8	7.1
WIND DIRECTION											
44777	50.5	-30.6	ALL	DIRN.	SUR	100	1	1	101.1	-49.2	112.4
44778	56.6	-38.9	ALL	DIRN.	SUR	216	0	0	107.4	-53.8	120.1
44779	53.2	-35.8	ALL	DIRN.	SUR	136	0	0	97.8	-28.0	101.7
52002	-2.0	164.8	ALL	DIRN.	SUR	36	0	0	42.3	30.6	52.2
52006	8.0	165.0	ALL	DIRN.	SUR	25	0	0	34.6	-39.6	52.6
52312	-1.9	-179.8	ALL	DIRN.	SUR	25	0	0	82.0	67.5	106.2
52521	15.7	135.3	ALL	DIRN.	SUR	124	0	0	116.6	49.3	126.6
52527	17.1	136.7	ALL	DIRN.	SUR	172	0	0	29.0	-42.6	51.6
55589	-20.5	152.1	ALL	DIRN.	SUR	118	0	0	27.7	-67.5	73.0
56513	-15.2	80.3	ALL	DIRN.	SUR	213	0	0	66.4	-66.4	93.9

AVAILABILITY - DRIBU - OCTOBER 1993

FIGURE 2

MAIN HOURS ONLY
10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS
TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS = 3085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10 22 29 16 10 0 4 25 16 62 0 5 14 13
17 11 29 28 7 3 0 0 4 4 14 15 15 309 40 1 6 17 17 9 0 7 7 2 4
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2 7 8 0 10 7 15 5 4 4 4 0 3 6 3 9 6 4
2 8 5 11 7 4 12 26 30 5 3 4 5 3 1 7 8 1 2
0 9 8 16 5 22 18 6 5 0 19 18 9 11 4 0 2 1 1 5 5 12 19
3 1 8 15 14 11 3 11 2 0 2 17 9 10
4 2 3 6 7 4 4 6 0 1 1 4 13 19 14 0
18 3 1 0

TABLE 3

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:October, 93

Monitoring procedures:

Period :One calendar month.
Data monitored :Statistics for each airline carrier.
Area monitored :90°N - 90°S, 180°W - 180°E.
Standard of comparison :Background field from Bracknell global model.

Observation times :All hours combined.

Level(s) monitored :70.0 - 500.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored :N REP.:Number of observations received excluding duplicates.
:PG :Percentage of observations with gross errors.
:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.
:PC :Percentage of observations with calm winds.
:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

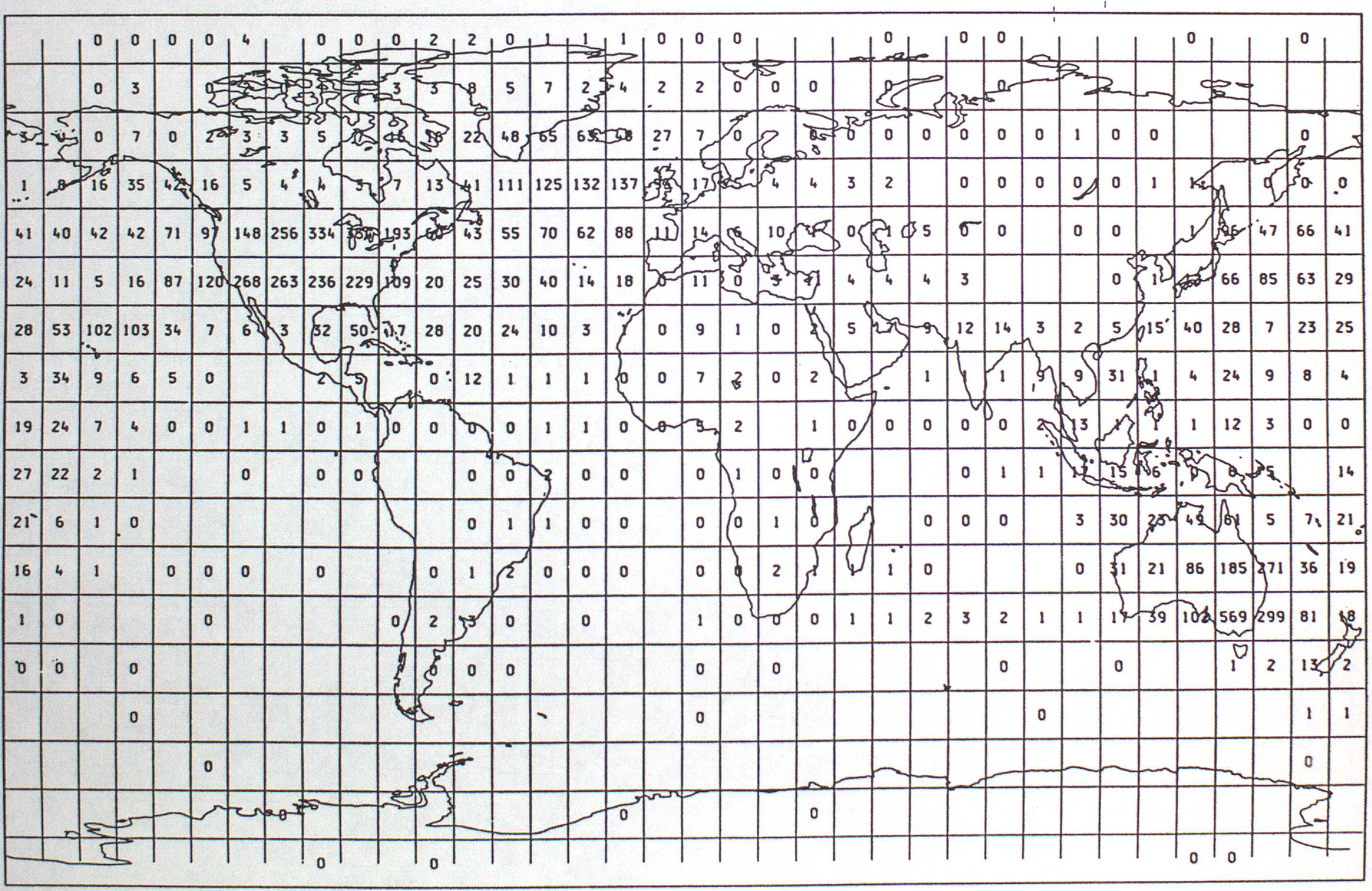
SELECTION CRITERIA :N REP ≥ 20

NB:- DUE TO A TEMPORARY ARCHIVING PROBLEM STATISTICS FOR IDENTIFIERS UAL, AN, BA, CO, DL, KL, NW AND QF DO NOT INCLUDE DATA BETWEEN 1500 UTC AND 2100 UTC. THIS DATA IS ALSO EXCLUDED FROM FIGURES 4 TO 7

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
UAL	53105	1	17	1.6	0.1	53101	0	16	0	8.6	1.2
AN	37304	0	60	1.6	0.1	36962	0	60	0	10.0	2.3
BA	14637	0	58	1.9	1.0	14598	0	58	0	8.9	1.3
CO	5594	0	55	1.5	0.7	5538	0	55	0	8.1	1.6
DL	343	1	100	2.8	0.7	343	33	100	0	44.9	1.4
KL	7614	0	87	2.2	1.6	7609	0	54	0	8.3	1.5
NW	30005	0	4	1.5	0.3	29971	0	7	0	8.1	1.2
QF	8589	0	54	1.4	0.0	8580	0	53	0	8.4	1.3

MEAN DAILY COUNT OF AIRCRAFT 70 - 500 HPA
OCTOBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED

FIGURE 3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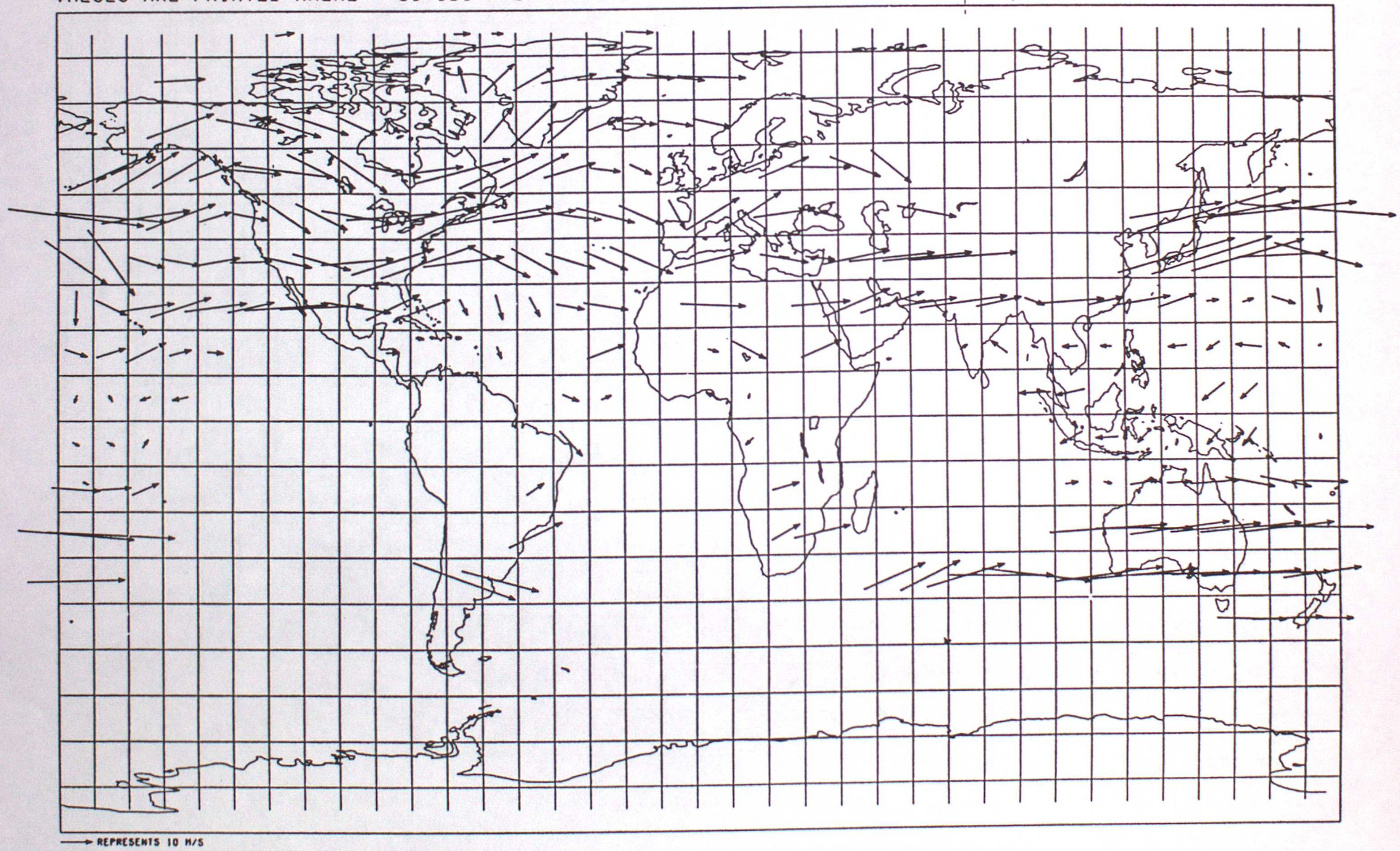
3 0 7 0 2 3 3 5 46 22 48 65 63 27 7 0 0 0 0 0 0 0 1 0 0 0
1 8 16 35 42 16 5 4 4 3 7 13 41 111 125 132 137 17 4 4 3 2 0 0 0 0 0 1 0 0 0
41 40 42 42 71 97 148 256 334 193 43 55 70 62 88 11 14 6 10 0 1 5 0 0 0 0 1 96 47 66 41
24 11 5 16 87 120 268 263 236 229 109 20 25 30 40 14 18 11 0 4 4 4 3 0 1 66 85 63 29
28 53 102 103 34 7 6 3 32 50 17 28 20 24 10 3 0 9 1 0 2 5 9 12 14 3 2 5 15 40 28 7 23 25
3 34 9 6 5 0 2 5 0 12 1 1 1 0 0 7 2 0 2 1 1 1 9 9 31 1 4 24 9 8 4
19 24 7 4 0 0 1 1 0 1 0 0 0 0 1 1 0 0 5 2 1 0 0 0 0 0 2 13 1 1 1 12 3 0 0
27 22 2 1 0 0 0 0 0 2 0 0 0 1 0 0 0 1 1 15 6 5 14
21 6 1 0 0 1 1 0 0 0 0 1 0 0 0 0 3 30 23 49 61 5 7 21
16 4 1 0 0 0 0 0 1 2 0 0 0 0 0 2 1 1 0 0 31 21 86 185 271 36 19
1 0 0 0 2 3 0 0 1 0 0 0 1 1 2 3 2 1 1 17 39 102 569 299 81 18
0 0 0 0 0 0 0 0 0 0 1 2 13 2
0 0 0 1 1
0 0
0 0
0 0 0 0

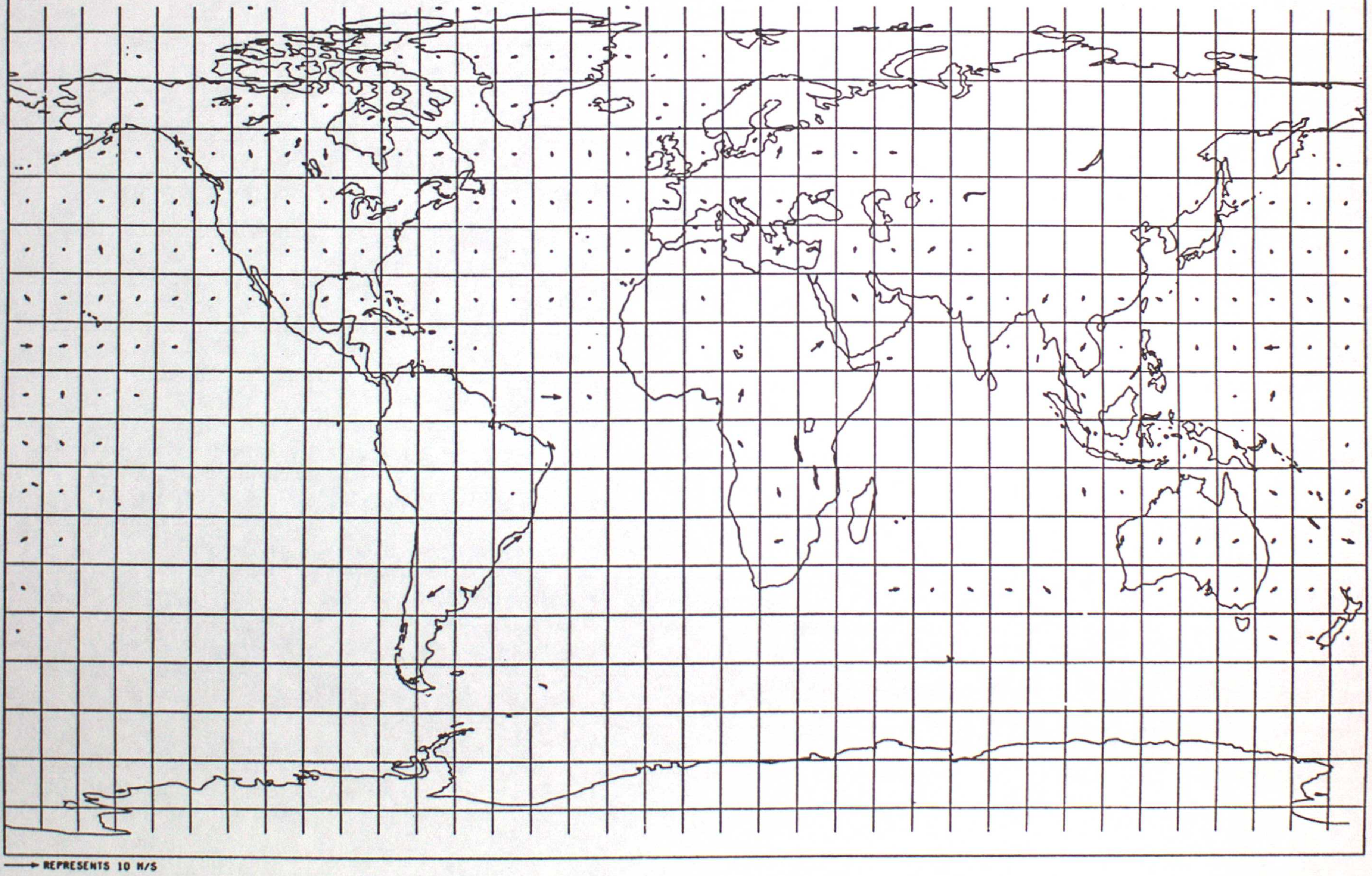
FIGURE 4

AIRCRAFT MEAN WINDS BETWEEN 70 AND 500 HPA
OCTOBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

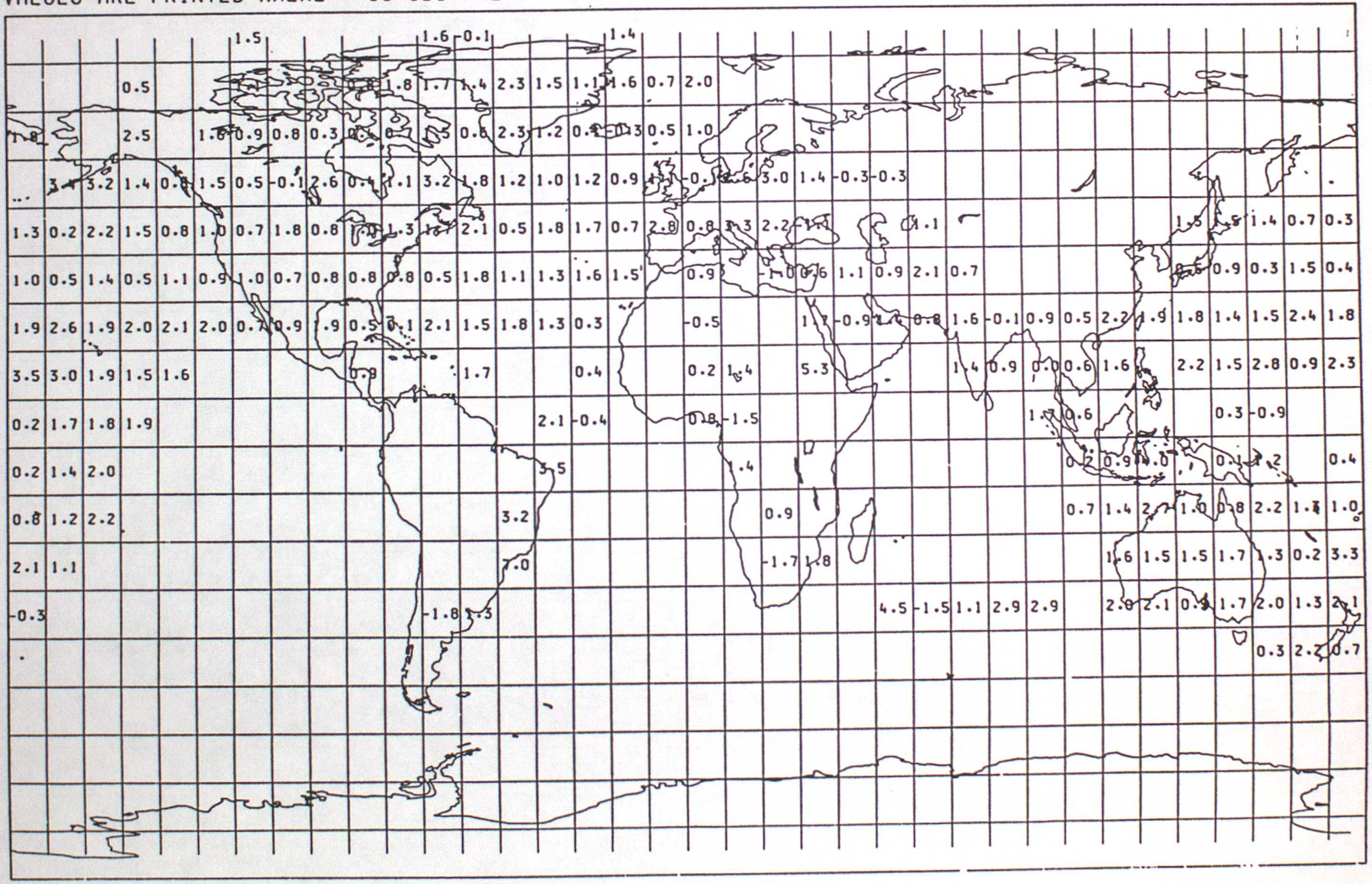


AIRCRAFT MEAN O-B WINDS BETWEEN 70 AND 500 HPA
OCTOBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 5



AIRCRAFT : MEAN O-B SPEEDS (M/S) BETWEEN 70 AND 500 HPA FIGURE 6
OCTOBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT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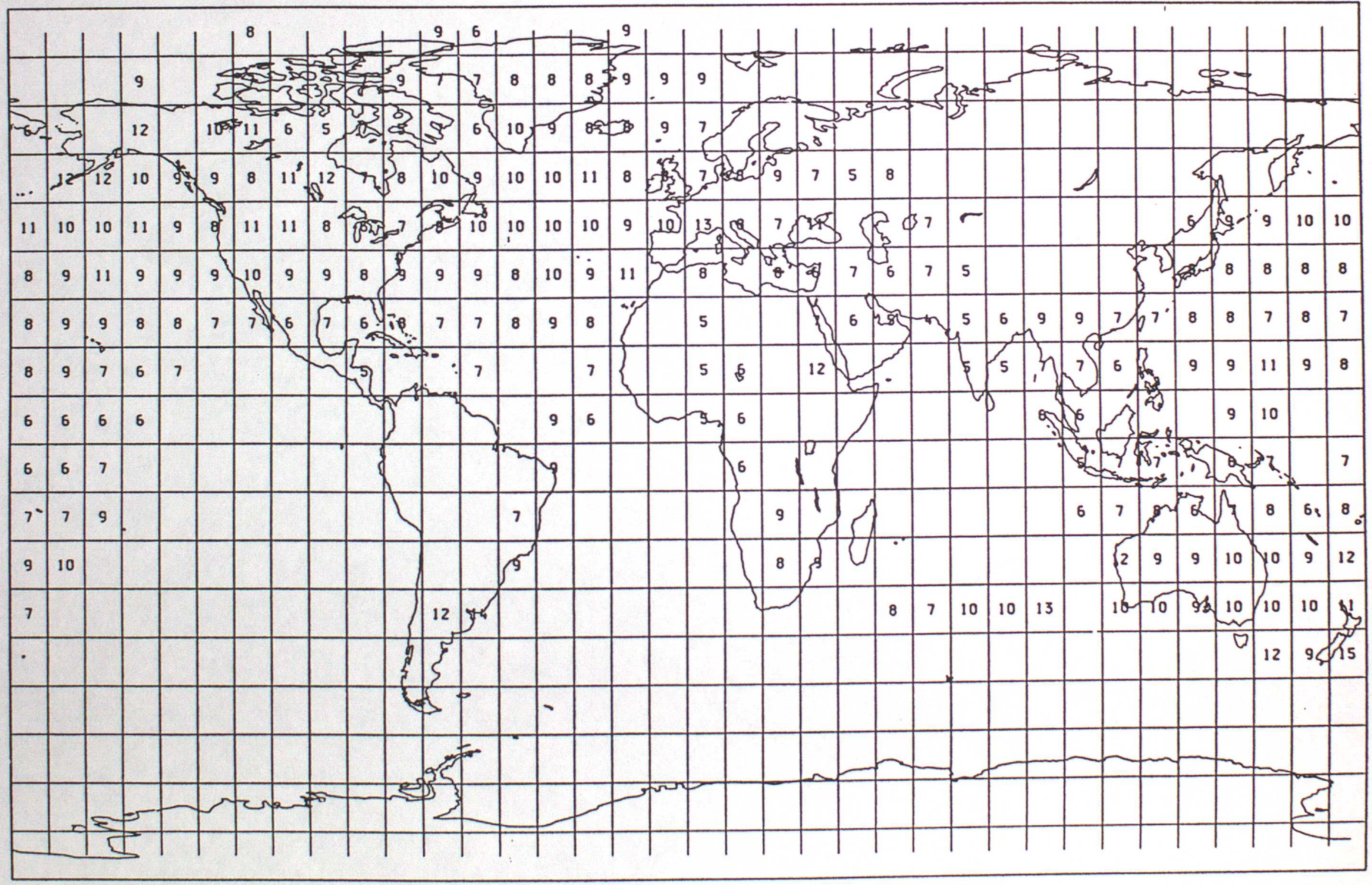
3.4 3.2 1.4 0.8 1.5 0.5 -0.1 2.6 0.4 1.1 3.2 1.8 1.2 1.0 1.2 0.9 3.0 1.4 -0.3 -0.3
1.3 0.2 2.2 1.5 0.8 1.0 0.7 1.8 0.8 1.3 2.1 0.5 1.8 1.7 0.7 2.8 0.8 3.3 2.2 1.1 1.5 1.5 1.4 0.7 0.3
1.0 0.5 1.4 0.5 1.1 0.9 1.0 0.7 0.8 0.8 0.8 0.5 1.8 1.1 1.3 1.6 1.5 0.9 0.6 1.1 0.9 2.1 0.7 0.5 0.9 0.3 1.5 0.4
1.9 2.6 1.9 2.0 2.1 2.0 0.7 0.9 1.9 0.5 0.1 2.1 1.5 1.8 1.3 0.3 -0.5 1.7 -0.9 1.4 0.8 1.6 -0.1 0.9 0.5 2.2 1.9 1.8 1.4 1.5 2.4 1.8
3.5 3.0 1.9 1.5 1.6 0.8 1.7 0.4 0.2 1.4 5.3 1.4 0.9 0.0 0.6 1.6 2.2 1.5 2.8 0.9 2.3
0.2 1.7 1.8 1.9 2.1 -0.4 0.8 -1.5 1.7 0.6 0.3 -0.9
0.2 1.4 2.0 3.5 1.4 0.2 0.9 1.0 0.1 1.2 0.4
0.8 1.2 2.2 3.2 0.9 0.7 1.4 2.7 1.0 0.8 2.2 1.3 1.0
2.1 1.1 7.0 -1.7 1.8 1.6 1.5 1.5 1.7 1.3 0.2 3.3
-0.3 -1.8 1.3 4.5 -1.5 1.1 2.9 2.9 2.0 2.1 0.9 1.7 2.0 1.3 2.1
0.3 2.2 0.7

AIRCRAFT : RMS O-B VECTOR (M/S) BETWEEN 70 AND 500 HPA FIGURE 7
OCTOBER 1993
OBSERVATIONS WITH RMSVW DIFFERENCE > 60 MPS EXCLUDED
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT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8 9 11 9 9 9 10 9 9 8 9 9 9 8 10 9 11 8 8 6 7 6 7 5 8 8 8 8
8 9 9 8 8 7 7 6 7 6 8 7 7 8 9 8 5 7 6 5 4 5 6 9 9 7 7 8 8 7 8 7
8 9 7 6 7 7 7 5 6 12 5 5 7 7 6 9 9 11 9 8
6 6 6 6 9 6 5 6 8 6 9 10
6 6 7 9 6 7 6 7 7
7 7 9 7 9 6 7 8 6 7 8 6 8
9 10 9 8 9 2 9 9 10 10 9 12
7 12 14 8 7 10 10 13 10 10 9 10 10 10 11
12 9 15

TABLE 4

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:October, 93

Monitoring procedures:
Period :One calendar month.
Data monitored :Reports from each unique identifier for radiosonde TEMPs.
Area monitored :90°N - 90°S, 180°W - 180°E.
Standard of comparison :Background field from Bracknell global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 30.0 hPa

Element monitored :GEOPOTENTIAL HEIGHT IN metres

Parameters monitored
:NUM OBS :Number of observations available at level shown during period.
:NUM GROSS :Number of gross errors at level shown during period.
:% REJ :Percentage of observations rejected by quality control at level shown during period.
:SD :SD of difference of observations from background values at level shown excluding those with gross errors.
:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.
:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.1

SELECTION CRITERIA :≥ 3 levels with ≥ 10 observations and ≥ 100 m weighted RMS.

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
17030	12	Z	30	41/ 36	14	0	144.6	116.4	185.6	6
20667	00	Z	70	73/ 70	20	0	41.6	120.2	127.2	6
23418	12	Z	200	65/ 57	30	0	48.3	70.7	85.6	4
31168	00	Z	250	56/ 138	13	0	30.6	90.5	95.6	9
31707	12	Z	250	48/ 131	19	0	49.0	-83.8	97.1	4
37985	00	Z	100	39/ 49	14	0	115.8	71.6	136.2	5
38836	00	Z	1000	39/ 69	22	0	16.7	32.3	36.4	6
41594	00	Z	150	32/ 73	10	0	77.1	-93.5	121.2	6
42027	00	Z	1000	34/ 75	14	1	18.0	50.1	53.2	5
42101	00	Z	100	30/ 76	17	0	137.7	-54.5	148.1	4
42101	12	Z	150	30/ 76	13	1	104.3	93.2	139.8	5
42182	00	Z	150	29/ 77	25	1	96.8	-70.2	119.6	6
42182	12	Z	50	29/ 77	13	1	181.6	127.1	221.6	7
42314	00	Z	100	27/ 95	14	0	152.7	74.4	169.8	5
42339	00	Z	150	26/ 73	23	2	111.0	-30.7	115.2	6
42339	12	Z	200	26/ 73	15	1	95.5	80.8	125.1	5
42361	00	Z	50	26/ 78	14	1	169.9	131.6	214.9	9
42361	12	Z	150	26/ 78	12	0	119.9	90.9	150.5	6
42369	00	Z	30	27/ 81	8	6	121.6	226.0	256.6	8
42369	12	Z	50	27/ 81	16	1	177.4	141.6	227.0	7
42379	00	Z	50	27/ 83	13	2	209.2	159.6	263.1	10
42379	12	Z	70	27/ 83	10	1	165.9	110.2	199.2	7
42410	00	Z	50	26/ 92	20	3	153.8	171.4	230.3	8
42492	00	Z	250	26/ 85	20	0	68.7	73.9	100.9	5
42492	12	Z	300	26/ 85	18	0	65.4	20.6	68.6	4
42647	00	Z	100	23/ 73	15	3	183.3	6.5	183.4	9
42647	12	Z	50	23/ 73	13	0	166.0	94.8	191.2	6
42667	00	Z	100	23/ 77	15	1	166.0	4.7	166.0	6
42724	00	Z	150	24/ 91	11	1	56.4	114.0	127.2	4
42779	00	Z	70	23/ 82	11	0	118.5	176.8	212.9	8
42809	00	Z	30	23/ 88	8	6	128.4	283.2	311.0	9
42809	12	Z	70	23/ 88	16	0	162.9	77.4	180.4	8
42867	00	Z	30	21/ 79	14	0	232.5	142.0	272.4	6
42867	12	Z	70	21/ 79	20	0	186.3	82.9	203.9	8
42971	00	Z	50	20/ 86	22	2	170.5	114.0	205.1	8
42971	12	Z	50	20/ 86	12	1	174.1	-20.3	175.3	4
43014	00	Z	70	20/ 75	14	1	133.5	120.4	179.8	9
43041	00	Z	70	19/ 82	18	4	166.7	115.4	202.8	8
43041	12	Z	250	19/ 82	14	0	89.7	51.9	103.6	7
43128	00	Z	50	17/ 78	14	1	192.2	144.5	240.5	7
43128	12	Z	70	17/ 78	13	0	203.3	57.5	211.3	7
43150	00	Z	150	18/ 83	20	0	100.8	41.3	108.9	4
43185	00	Z	100	16/ 81	9	3	156.6	10.8	157.0	7
43185	12	Z	150	16/ 81	16	0	77.2	106.9	131.9	4
43192	00	Z	50	15/ 74	12	1	189.7	-74.4	203.7	6
43192	12	Z	100	15/ 74	10	0	166.7	-32.3	169.8	7
43279	00	Z	70	13/ 80	13	0	177.9	65.6	189.7	4
43279	12	Z	70	13/ 80	14	2	161.4	89.6	184.6	7
43285	00	Z	70	13/ 75	15	1	127.9	191.1	229.9	7
43285	12	Z	70	13/ 75	17	1	131.7	165.4	211.4	10
43295	00	Z	100	13/ 78	18	1	110.0	136.9	175.7	6
43311	00	Z	150	11/ 73	15	0	145.1	-46.1	152.3	4
43311	12	Z	150	11/ 73	16	0	94.2	110.3	145.1	6
43333	00	Z	150	12/ 93	19	0	118.2	40.5	124.9	4
43346	00	Z	70	11/ 80	13	0	179.3	39.8	183.7	7
43346	12	Z	150	11/ 80	24	1	102.9	18.1	104.5	6
43353	00	Z	150	10/ 76	12	0	92.0	62.6	111.3	5
43369	00	Z	150	8/ 73	16	1	125.6	-44.9	133.4	9
43369	12	Z	150	8/ 73	18	0	124.0	51.4	134.2	4
43371	00	Z	50	8/ 77	16	2	233.6	41.9	237.3	8
43371	12	Z	70	8/ 77	17	1	171.7	105.5	201.5	7
44288	00	Z	150	46/ 103	8	4	36.5	205.4	208.6	7
44288	12	Z	100	46/ 103	5	6	35.4	246.4	248.9	7

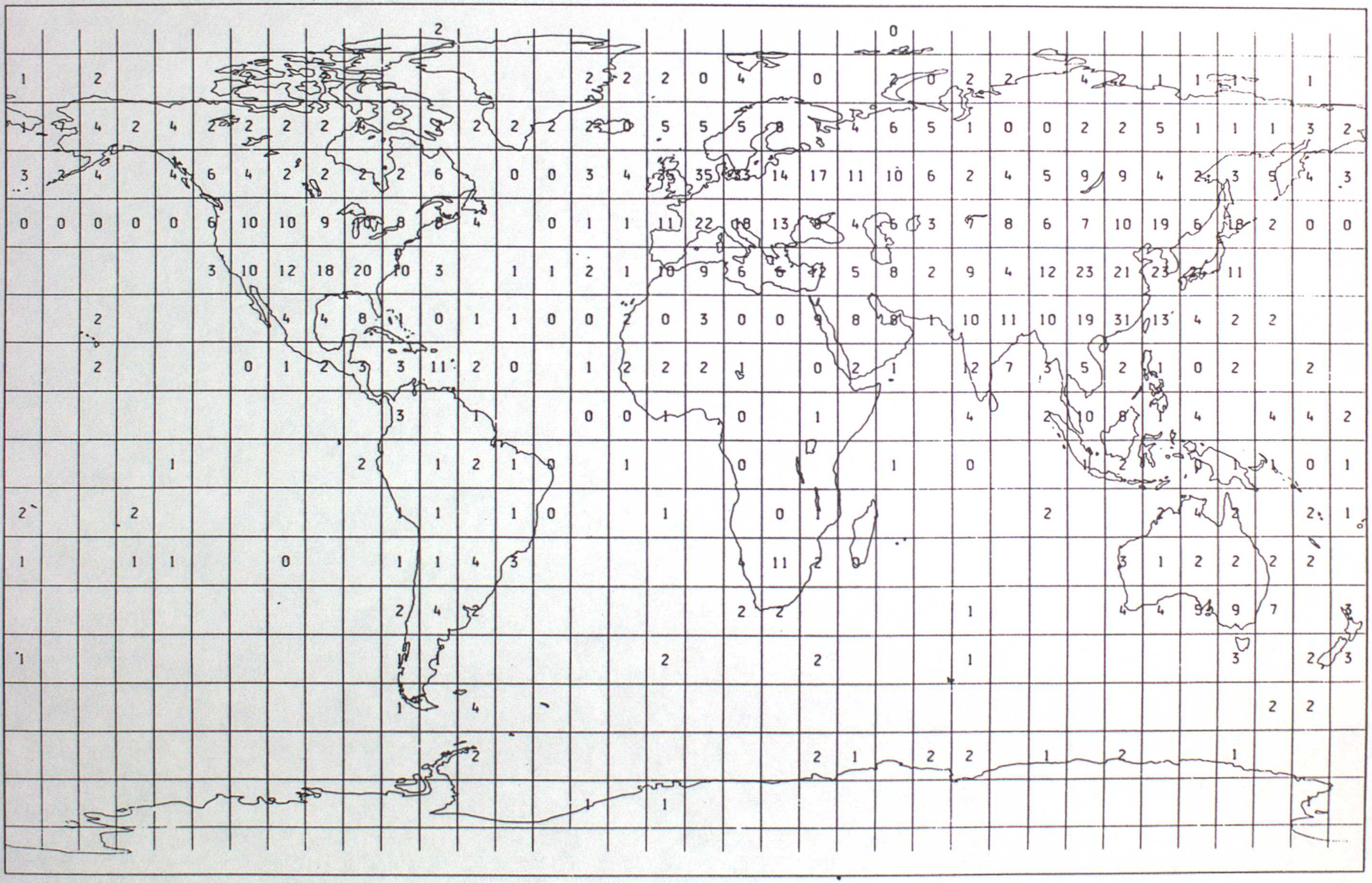
WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
48327	00	Z	70	19/ 99	22	0	79.7	135.4	157.1	4
54135	12	Z	150	44/ 122	24	0	54.9	92.0	107.2	5
54161	00	Z	100	44/ 125	27	1	55.5	99.4	113.8	7
54161	12	Z	200	44/ 125	29	0	40.7	100.7	108.6	9
56739	12	Z	1000	25/ 98	30	1	19.0	61.8	64.6	4
57516	00	Z	100	30/ 106	27	1	64.4	116.3	132.9	5
57516	12	Z	100	30/ 106	21	0	51.9	122.7	133.2	5
58238	00	Z	200	32/ 119	28	0	21.1	80.0	82.8	4
60360	12	Z	500	37/ 8	1	18	0.0	-147.0	147.0	9
61223	12	Z	150	17/ -3	12	0	60.6	90.3	108.7	7
62306	12	Z	50	31/ 27	9	3	43.4	347.6	350.3	6
62378	12	Z	70	30/ 31	6	4	59.4	288.0	294.1	6
70414	00	Z	400	53/ 174	26	1	46.6	37.5	59.8	4
82332	12	Z	30	-3/ -60	22	0	43.2	195.8	200.5	4
83746	12	Z	30	-23/ -43	21	0	55.5	205.4	212.8	5
86218	12	Z	70	-25/ -58	10	0	97.7	154.5	182.8	6
89664	00	Z	1000	-78/ 167	13	2	35.5	-5.0	35.8	8
91557	12	Z	700	-18/ 168	27	2	15.9	-78.7	80.3	8

AVAILABILITY - TEMP - 500 HPA GEOPOTENTIAL - OCTOBER 1993 FIGURE 8

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS - 1318



2 0
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0 0 0 0 0 6 10 10 9 10 8 8 4 0 1 1 11 22 18 13 8 4 6 3 7 8 6 7 10 19 6 18 2 0 0
3 10 12 18 20 10 3 1 1 2 1 10 9 6 6 12 5 8 2 9 4 12 23 21 23 23 11
2 4 4 8 1 0 1 1 0 0 2 0 3 0 0 9 8 8 1 10 11 10 19 31 13 4 2 2
2 0 1 2 3 3 11 2 0 1 2 2 2 1 0 2 1 12 7 3 5 2 1 0 2 2
3 1 0 0 1 0 1 4 2 10 8 1 4 4 4 2
1 2 1 2 1 0 1 0 1 0 1 2 1 0 1
2 2 1 1 1 0 1 0 1 2 2 4 2 2 1
1 1 1 0 1 1 4 3 4 11 2 0 3 1 2 2 2 2
2 4 2 2 2 1 4 4 5 9 7 3
1 1 1 2 2 1 3 2 3
1 4 2 2
2 2 1 2 2 1 2 1
1 1 1

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:October, 93

Monitoring procedures:		
Period	:One calendar month.	
Data monitored	:Reports from each unique identifier for radiosonde TEMPs.	
Area monitored	:90°N - 90°S, 180°W - 180°E.	
Standard of comparison	:Background field from Bracknell global model.	
Observation times	:00 UTC and 12 UTC.	
Level(s) monitored	:Standard levels between 1000.0 - 100.0 hPa	
Element monitored	:VECTOR WIND in m s^{-1}	
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.2	
SELECTION CRITERIA	:≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind. ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN	

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
25123	12	V	250	69/ 161	13	0	15	6.6	1.1	16.1	1
44292	12	V	250	48/ 107	12	0	8	-3.1	-3.6	17.0	1
87418	12	V	300	-33/ -69	22	0	100	3.2	-0.4	17.5	3

AVAILABILITY - TEMP/PILOT - 300 HPA WIND - OCTOBER 1993 FIGURE 9

ALL HOURS

10 DEGREE BOX AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS

TOTAL AVERAGE NUMBER OF OBSERVATIONS IN 24 HOURS - 1427

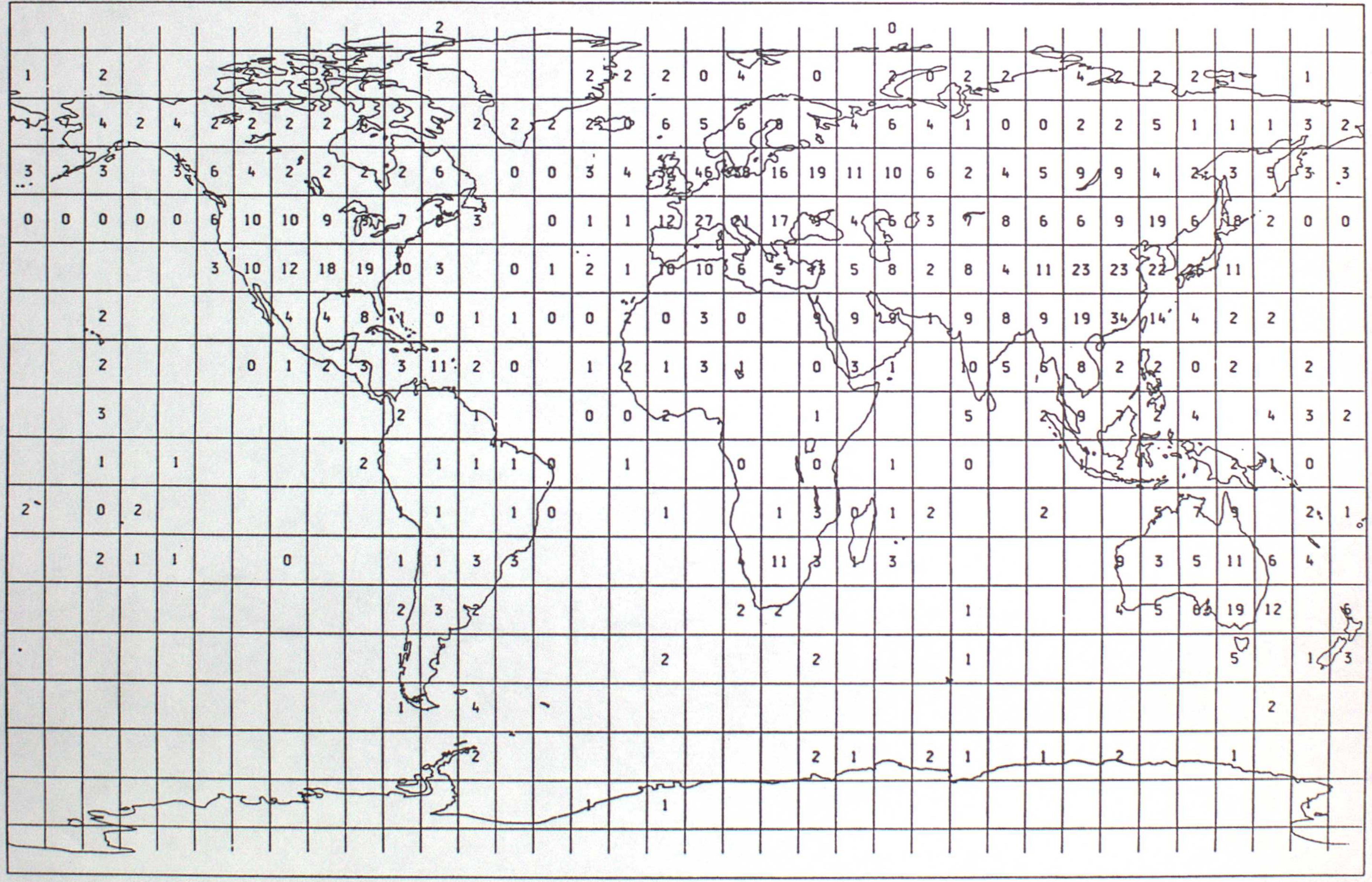


TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH:October, 93

Monitoring procedures:

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from Bracknell global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 500.0 - 150.0 hPa

Element monitored :WIND DIRECTION in degrees

Parameters monitored
:NUM OBS :Average number of observations at all levels.
:BIAS :Mean difference of observations from background values from all levels.
:MAX SPREAD :(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels.
:SD :SD of difference of observations from background values at all levels.

SELECTION CRITERIA :NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
24641	00	DD	64/ 122	17	13.1	3.4	9.3
24641	12	DD	64/ 122	16	10.9	4.8	9.5
25123	00	DD	69/ 161	17	12.2	4.9	11.0
25123	12	DD	69/ 161	11	12.5	4.6	12.6
25399	12	DD	66/-170	21	12.3	5.9	14.1
28952	00	DD	53/ 64	30	-22.7	1.4	9.4
28952	12	DD	53/ 64	30	-23.1	4.8	9.8
31707	00	DD	48/ 131	16	14.0	3.7	11.6
31707	12	DD	48/ 131	16	21.4	8.2	23.5
35108	12	DD	51/ 51	28	-22.7	4.4	10.2
40430	00	DD	25/ 40	26	-12.6	5.9	16.5
41024	00	DD	22/ 39	26	-12.6	6.8	16.8
42314	00	DD	27/ 95	17	-10.7	8.6	15.0
42314	12	DD	27/ 95	11	-13.4	6.6	13.7
42867	00	DD	21/ 79	13	-10.7	6.7	18.3
42867	12	DD	21/ 79	14	-10.9	8.8	18.5
43311	12	DD	11/ 73	11	-10.4	7.6	22.4
48601	00	DD	5/ 100	14	11.9	9.9	24.5
60571	00	DD	32/ -2	29	11.7	4.3	12.1
67774	00	DD	-18/ 31	17	-10.1	8.1	25.3
80413	12	DD	10/ -68	14	-12.7	8.1	26.3
83780	12	DD	-24/ -47	22	14.1	8.2	23.0

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH:October, 93

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES, METEOSAT, GMS, INSAT.

Standard of comparison :Background field from Bracknell global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer:
701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

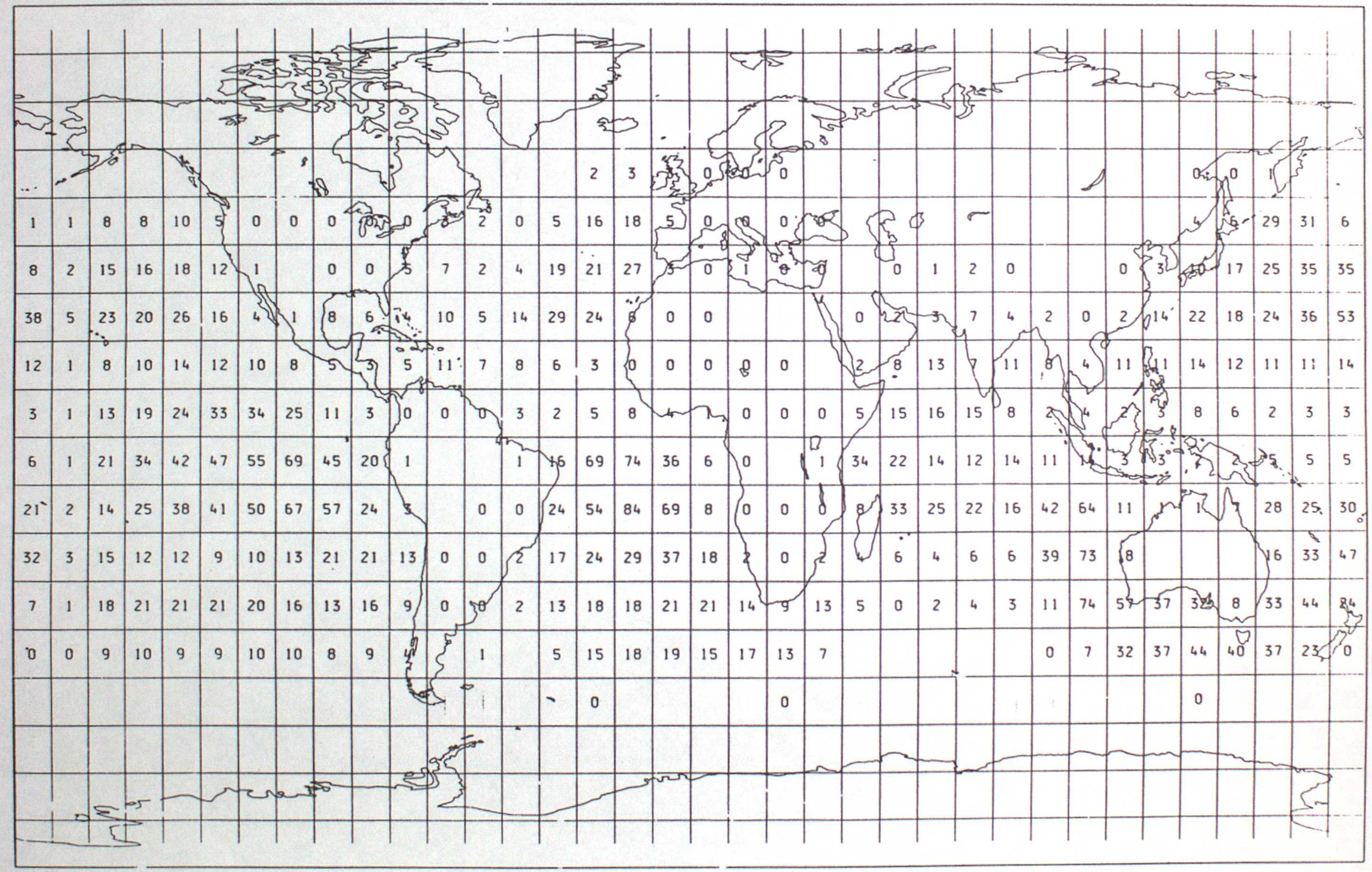
:Mean wind

:Mean observation minus background vector wind differences

:Mean observation minus background speed differences

:RMS of observation minus background vector differences

AVERAGE DAILY NUMBER OF SATOB OBSER\ATIONS BETWEEN 701 AND 1000 HPA FIGURE 10
OCTOBER 1993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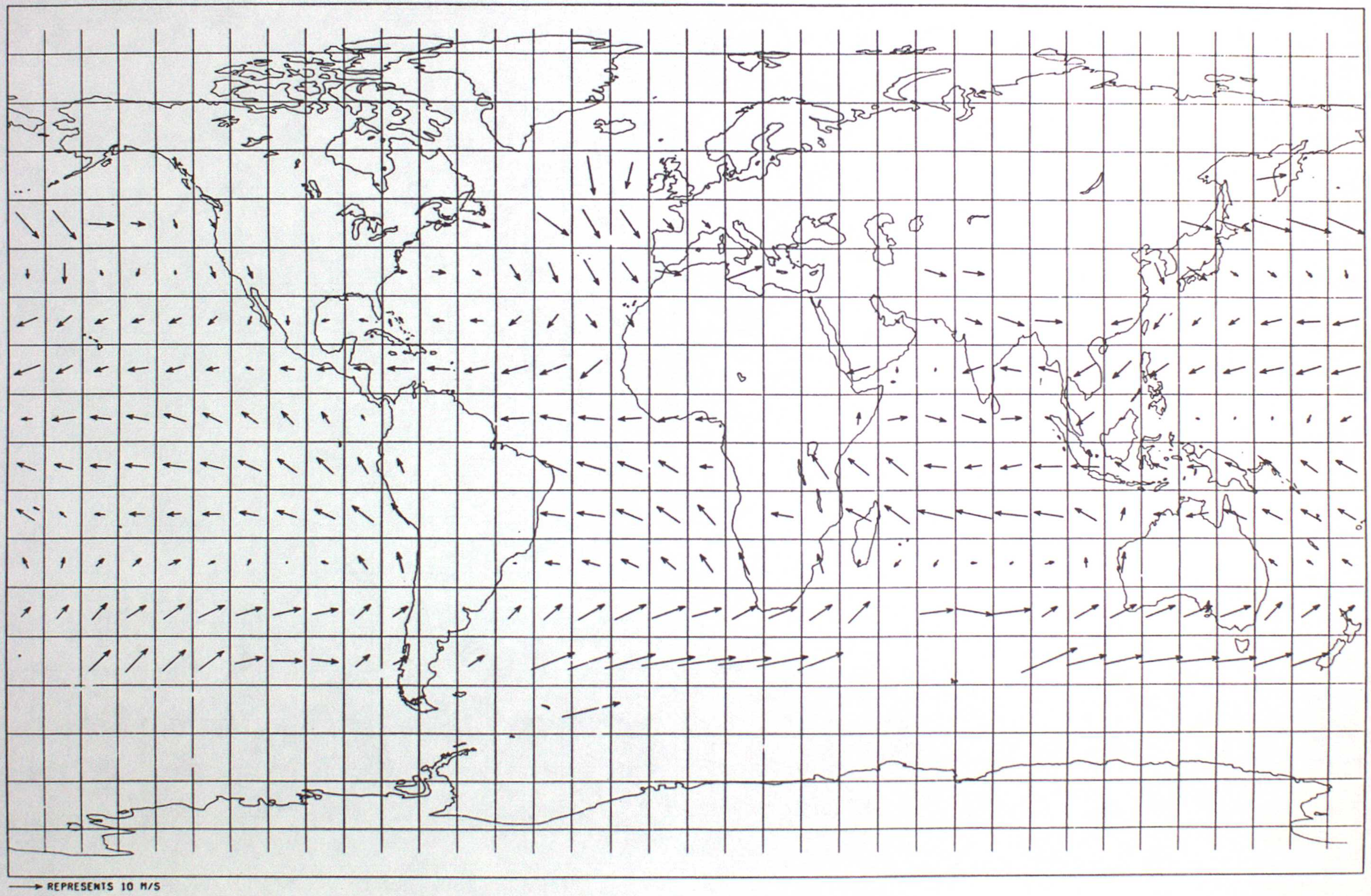
38 5 23 20 26 16 4 1 8 6 14 10 5 14 29 24 8 0 0 0 2 3 7 4 2 0 2 14 22 18 24 36 53
12 1 8 10 14 12 10 8 5 3 5 11 7 8 6 3 0 0 0 0 0 2 8 13 7 11 8 4 11 11 14 12 11 11 14
3 1 13 19 24 33 34 25 11 3 0 0 0 3 2 5 8 4 1 0 0 0 5 15 16 15 8 2 4 2 3 8 6 2 3 3
6 1 21 34 42 47 55 69 45 20 1 1 16 69 74 36 6 0 1 34 22 14 12 14 11 14 3 3 7 2 5 5 5
21 2 14 25 38 41 50 67 57 24 3 0 0 24 54 84 69 8 0 0 0 8 33 25 22 16 42 64 11 1 1 7 28 25 30
32 3 15 12 12 9 10 13 21 21 13 0 0 2 17 24 29 37 18 2 0 2 4 6 4 6 6 39 73 18 16 33 47
7 1 18 21 21 21 20 16 13 16 9 0 0 2 13 18 18 21 21 14 9 13 5 0 2 4 3 11 74 57 37 32 8 33 44 34
0 0 9 10 9 9 10 10 8 9 4 1 5 15 18 19 15 17 13 7 0 7 32 37 44 40 37 23 0
0 0 0

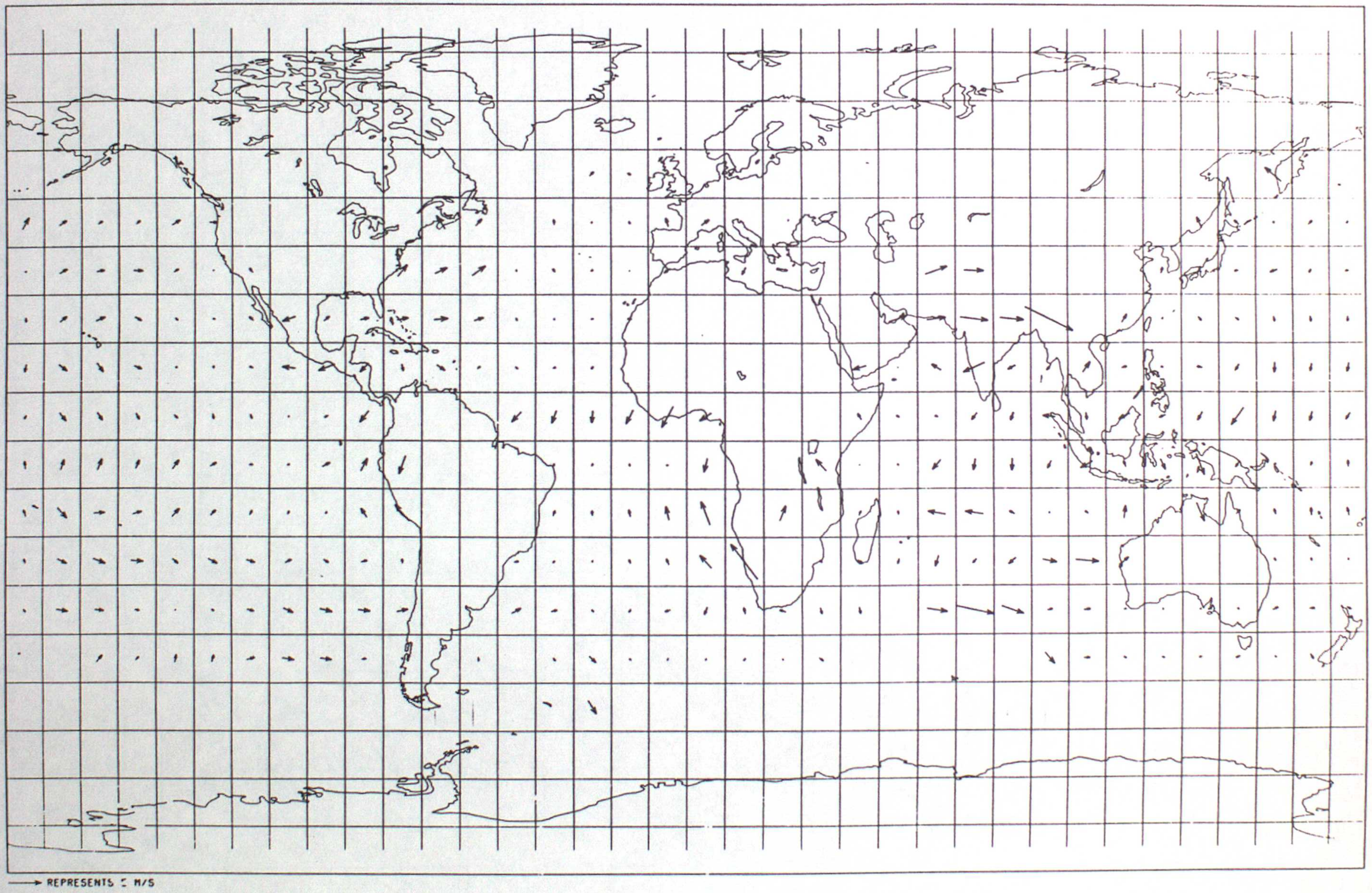
SATOB VECTOR MEAN WINDS BETWEEN 701-1000 HPA
OCTOBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 11

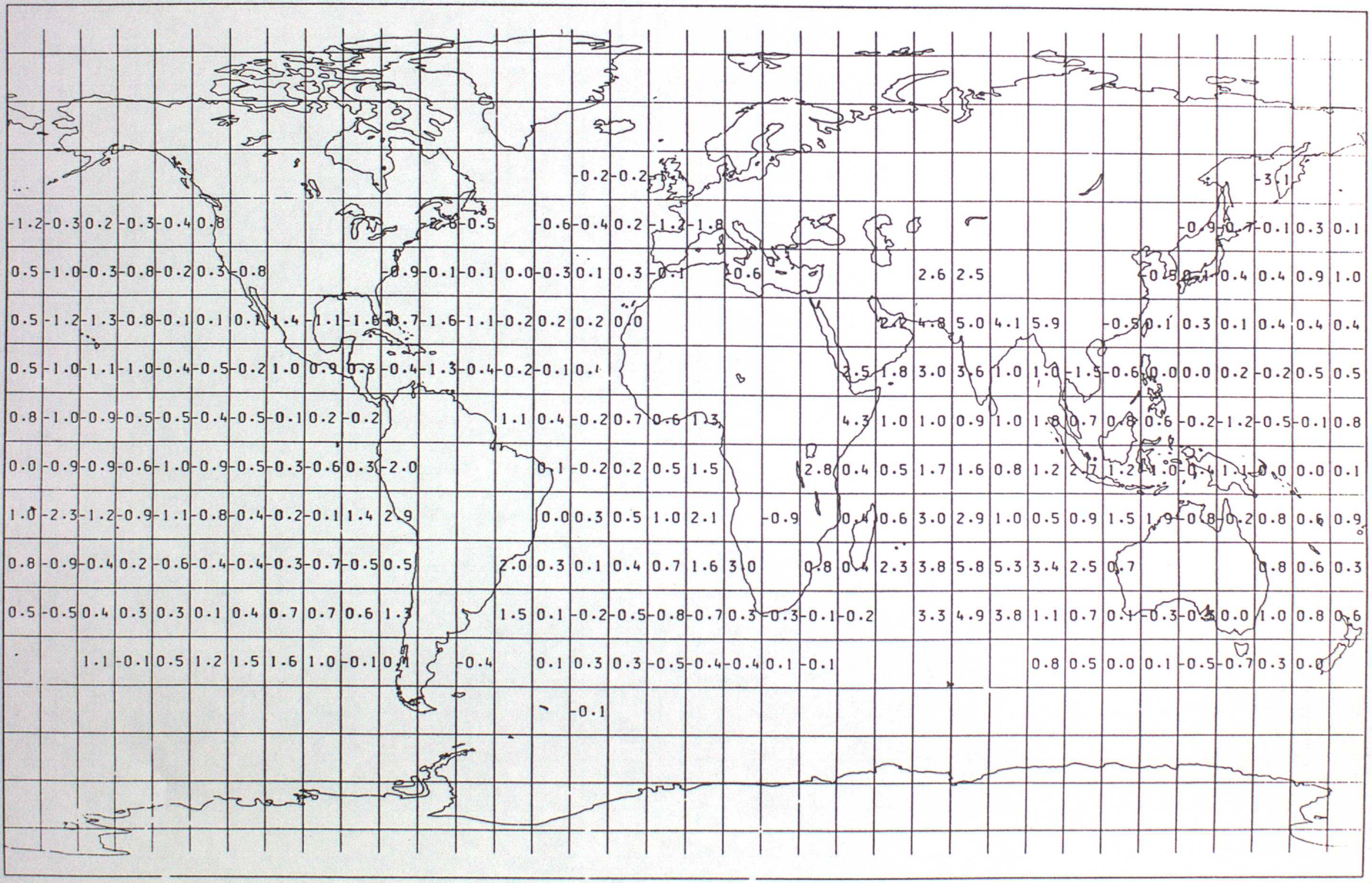

→ REPRESENTS 10 M/S

SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 701-1000 HPA
OCTOBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 12

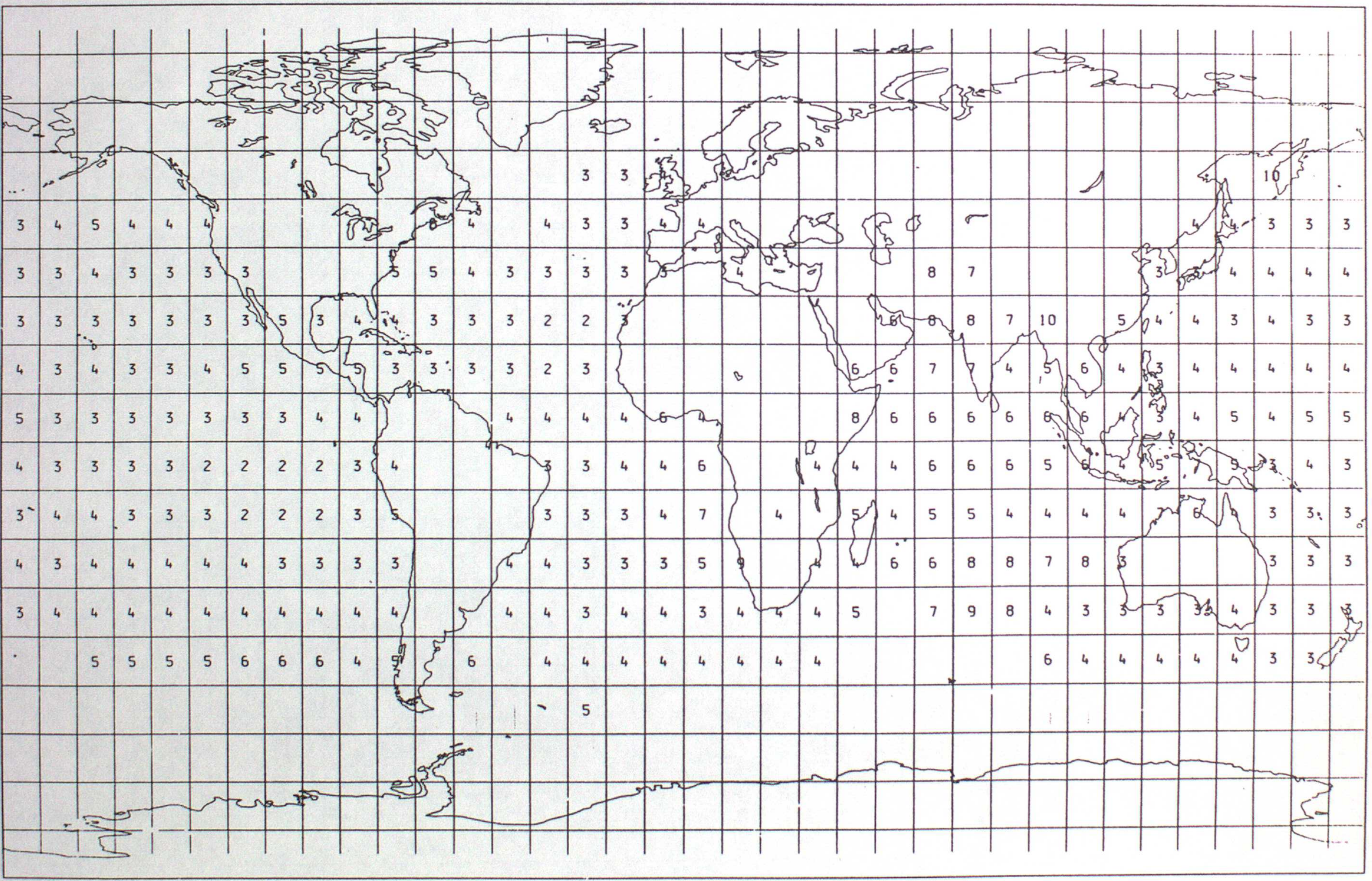

REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 13
OCTOBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT



-0.2 -0.2 -3.1
-1.2 -0.3 0.2 -0.3 -0.4 0.8 -0.5 -0.6 -0.4 0.2 -1.2 -1.8 -0.9 -0.7 -0.1 0.3 0.1
0.5 -1.0 -0.3 -0.8 -0.2 0.3 -0.8 -0.9 -0.1 -0.1 0.0 -0.3 0.1 0.3 -0.1 0.6 2.6 2.5 -0.5 0.4 0.4 0.9 1.0
0.5 -1.2 -1.3 -0.8 -0.1 0.1 0.1 1.4 -1.1 -1.6 0.7 -1.6 -1.1 -0.2 0.2 0.2 0.0 2.2 4.8 5.0 4.1 5.9 -0.5 0.1 0.3 0.1 0.4 0.4 0.4
0.5 -1.0 -1.1 -1.0 -0.4 -0.5 -0.2 1.0 0.9 0.3 -0.4 -1.3 -0.4 -0.2 -0.1 0.1 2.5 1.8 3.0 3.6 1.0 1.0 -1.5 -0.6 0.0 0.0 0.2 -0.2 0.5 0.5
0.8 -1.0 -0.9 -0.5 -0.5 -0.4 -0.5 -0.1 0.2 -0.2 1.1 0.4 -0.2 0.7 0.6 1.3 4.3 1.0 1.0 0.9 1.0 1.8 0.7 0.8 0.6 -0.2 -1.2 -0.5 -0.1 0.8
0.0 -0.9 -0.9 -0.6 -1.0 -0.9 -0.5 -0.3 -0.6 0.3 -2.0 0.1 -0.2 0.2 0.5 1.5 2.8 0.4 0.5 1.7 1.6 0.8 1.2 2.7 1.2 -1.0 -0.4 1.1 0.0 0.0 0.1
1.0 -2.3 -1.2 -0.9 -1.1 -0.8 -0.4 -0.2 -0.1 1.4 2.9 0.0 0.3 0.5 1.0 2.1 -0.9 0.4 0.6 3.0 2.9 1.0 0.5 0.9 1.5 1.9 -0.8 -0.2 0.8 0.6 0.9
0.8 -0.9 -0.4 0.2 -0.6 -0.4 -0.4 -0.3 -0.7 -0.5 0.5 2.0 0.3 0.1 0.4 0.7 1.6 3.0 0.8 0.4 2.3 3.8 5.8 5.3 3.4 2.5 0.7 0.8 0.6 0.3
0.5 -0.5 0.4 0.3 0.3 0.1 0.4 0.7 0.7 0.6 1.3 1.5 0.1 -0.2 -0.5 -0.8 -0.7 0.3 -0.3 -0.1 -0.2 3.3 4.9 3.8 1.1 0.7 0.1 -0.3 -0.3 0.0 1.0 0.8 0.6
1.1 -0.1 0.5 1.2 1.5 1.6 1.0 -0.1 0.1 -0.4 0.1 0.3 0.3 -0.5 -0.4 -0.4 0.1 -0.1 0.8 0.5 0.0 0.1 -0.5 -0.7 0.3 0.0
-0.1

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 701 AND 1000 HPA FIGURE 14
OCTOBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


3 3 10
3 4 5 4 4 4 4 4 3 3 4 4 4 4 3 3 3
3 3 4 3 3 3 3 5 5 4 3 3 3 3 3 4 8 7 3 4 4 4 4
3 3 3 3 3 3 3 5 3 4 4 3 3 3 2 2 3 6 8 8 7 10 5 4 4 3 4 3 3
4 3 4 3 3 4 5 5 5 5 3 3 3 3 2 3 6 6 7 7 4 5 6 4 3 4 4 4 4 4
5 3 3 3 3 3 3 3 4 4 4 4 4 4 6 4 8 6 6 6 6 6 6 4 3 4 5 4 5 5
4 3 3 3 3 2 2 2 2 3 4 3 3 4 4 6 4 4 4 6 6 6 5 6 4 5 5 3 4 3
3 4 4 3 3 3 2 2 2 3 5 3 3 3 4 7 4 5 4 5 5 4 4 4 4 7 6 4 3 3 3
4 3 4 4 4 4 4 3 3 3 3 4 4 3 3 3 5 9 4 4 6 6 8 8 7 8 3 3 3 3
3 4 4 4 4 4 4 4 4 4 4 4 4 3 4 4 3 4 4 4 5 7 9 8 4 3 3 3 3 4 3 3 3
5 5 5 5 6 6 6 4 5 6 4 4 4 4 4 4 4 4 6 4 4 4 4 4 3 3
5

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 401 AND 700 HPA FIGURE 15
OCTOBER 1993

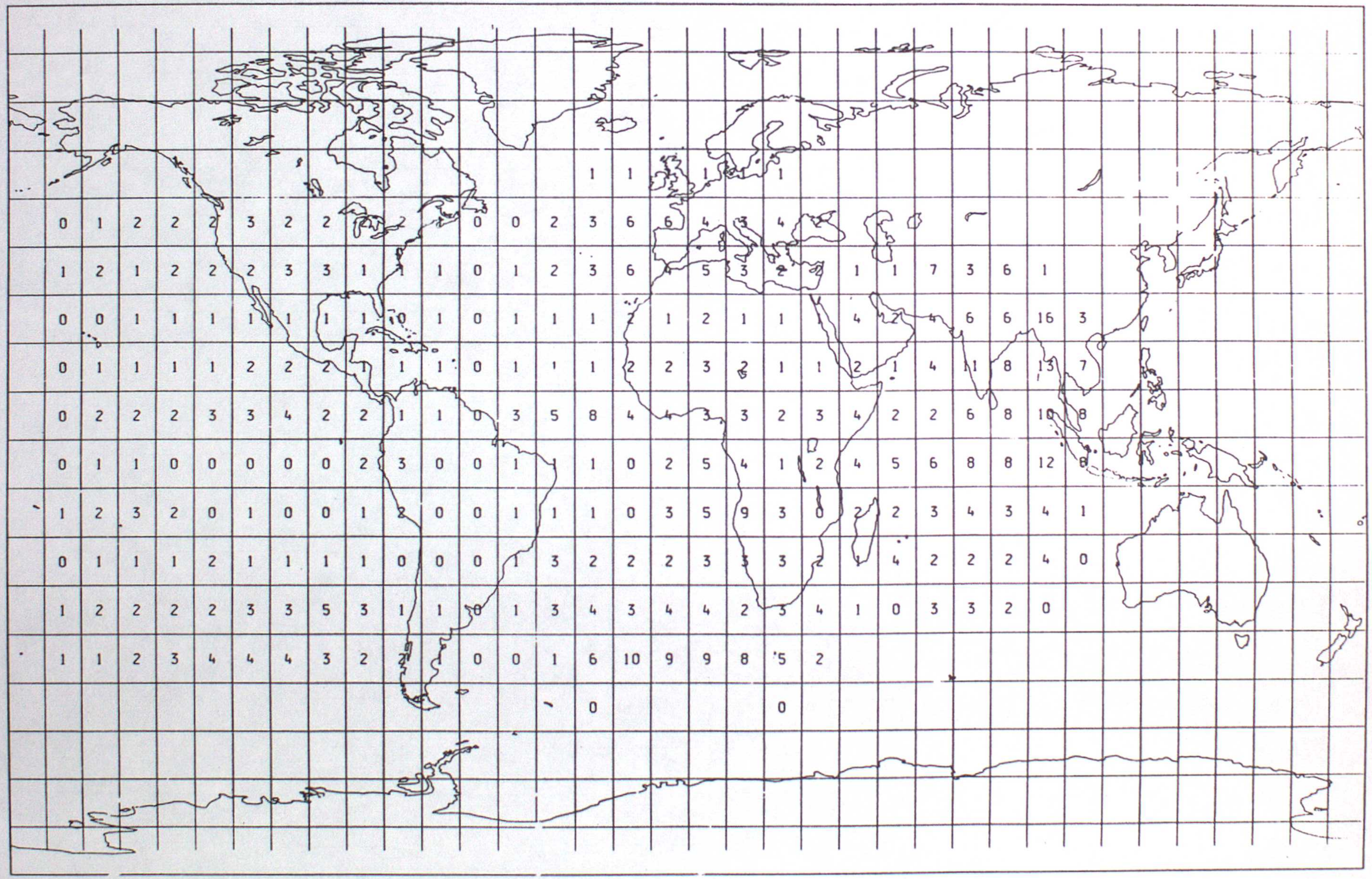
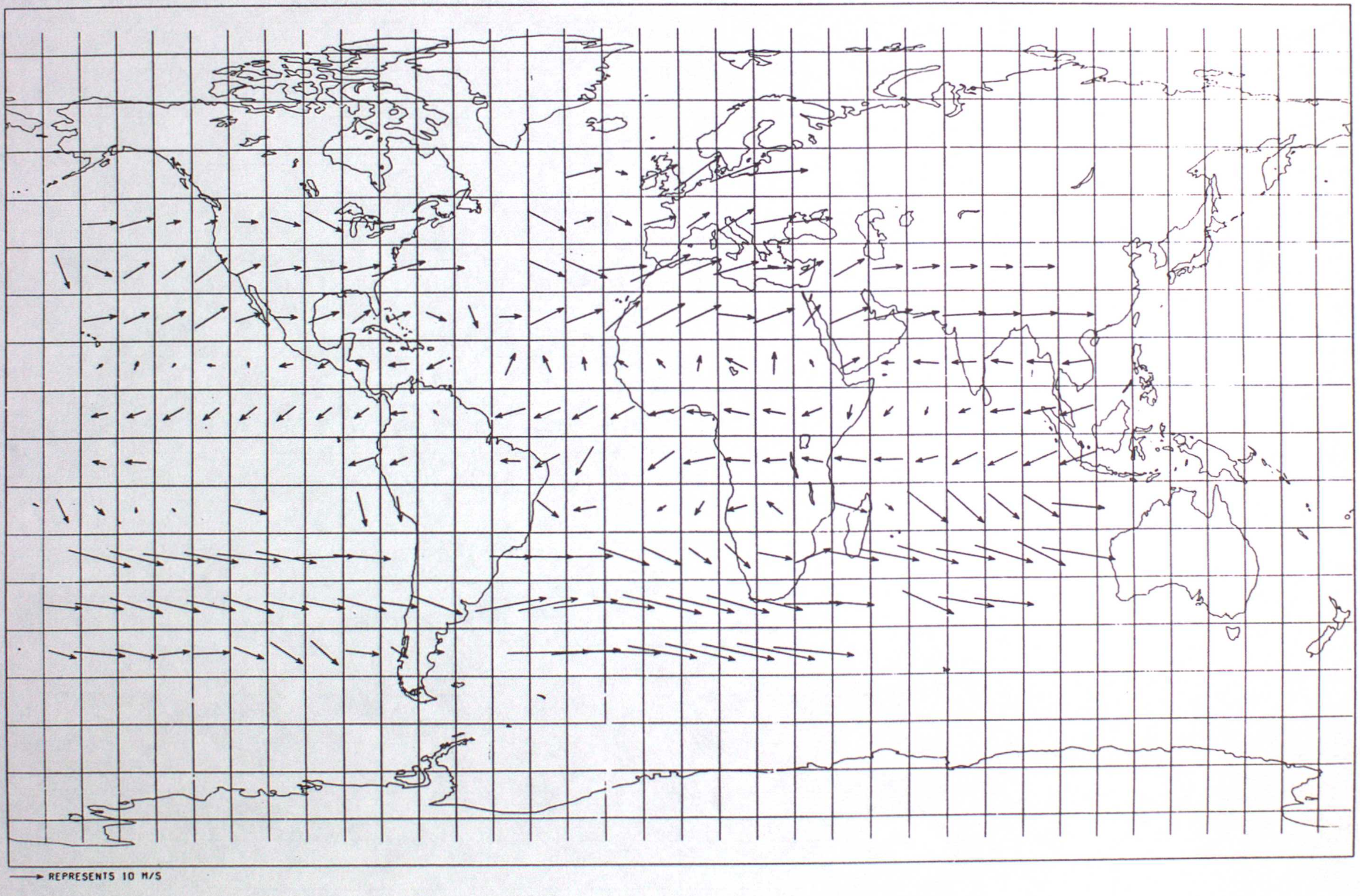

1 1 1 1 1
0 1 2 2 2 3 2 2 2 2 0 0 2 3 6 6 4 3 4
1 2 1 2 2 2 3 3 1 1 1 0 1 2 3 6 4 5 3 2 2 1 1 7 3 6 1
0 0 1 1 1 1 1 1 1 0 1 0 1 1 1 2 1 2 1 1 1 4 2 4 6 6 16 3
0 1 1 1 1 2 2 2 1 1 1 0 1 1 1 2 2 3 2 1 1 2 1 4 11 8 13 7
0 2 2 2 3 3 4 2 2 1 1 0 3 5 8 4 4 3 3 2 3 4 2 2 6 8 10 8
0 1 1 0 0 0 0 0 2 3 0 0 1 1 1 0 2 5 4 1 2 4 5 6 8 8 12 8
1 2 3 2 0 1 0 0 1 2 0 0 1 1 1 0 3 5 9 3 0 2 2 3 4 3 4 1
0 1 1 1 2 1 1 1 1 0 0 0 1 3 2 2 2 3 3 3 2 1 4 2 2 2 4 0
1 2 2 2 2 3 3 5 3 1 1 0 1 3 4 3 4 4 2 3 4 1 0 3 3 2 0
1 1 2 3 4 4 4 3 2 2 1 0 0 1 6 10 9 9 8 5 2
0 0

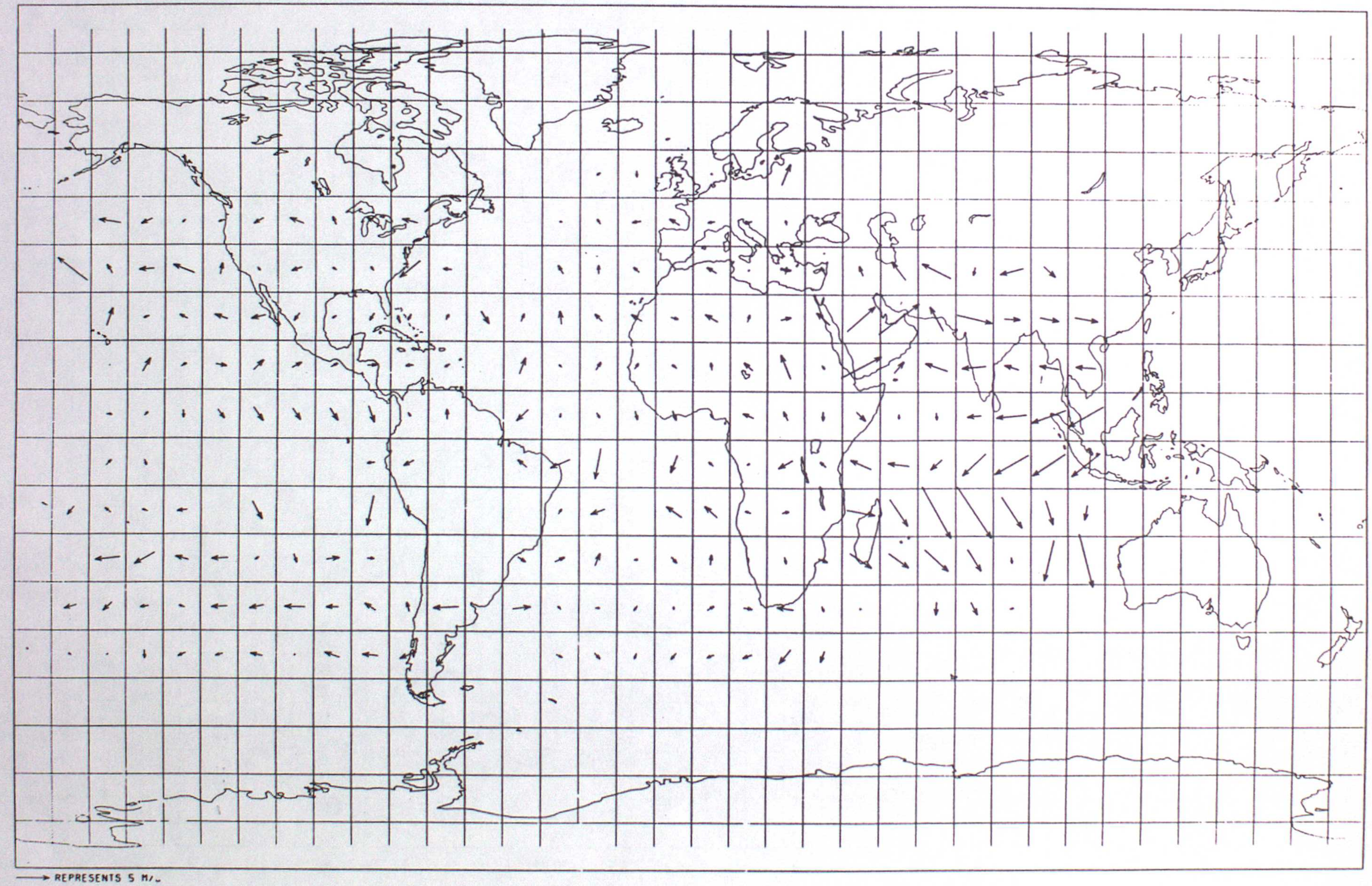
FIGURE 16

SATOB VECTOR MEAN WINDS BETWEEN 401-700 HPA
OCTOBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

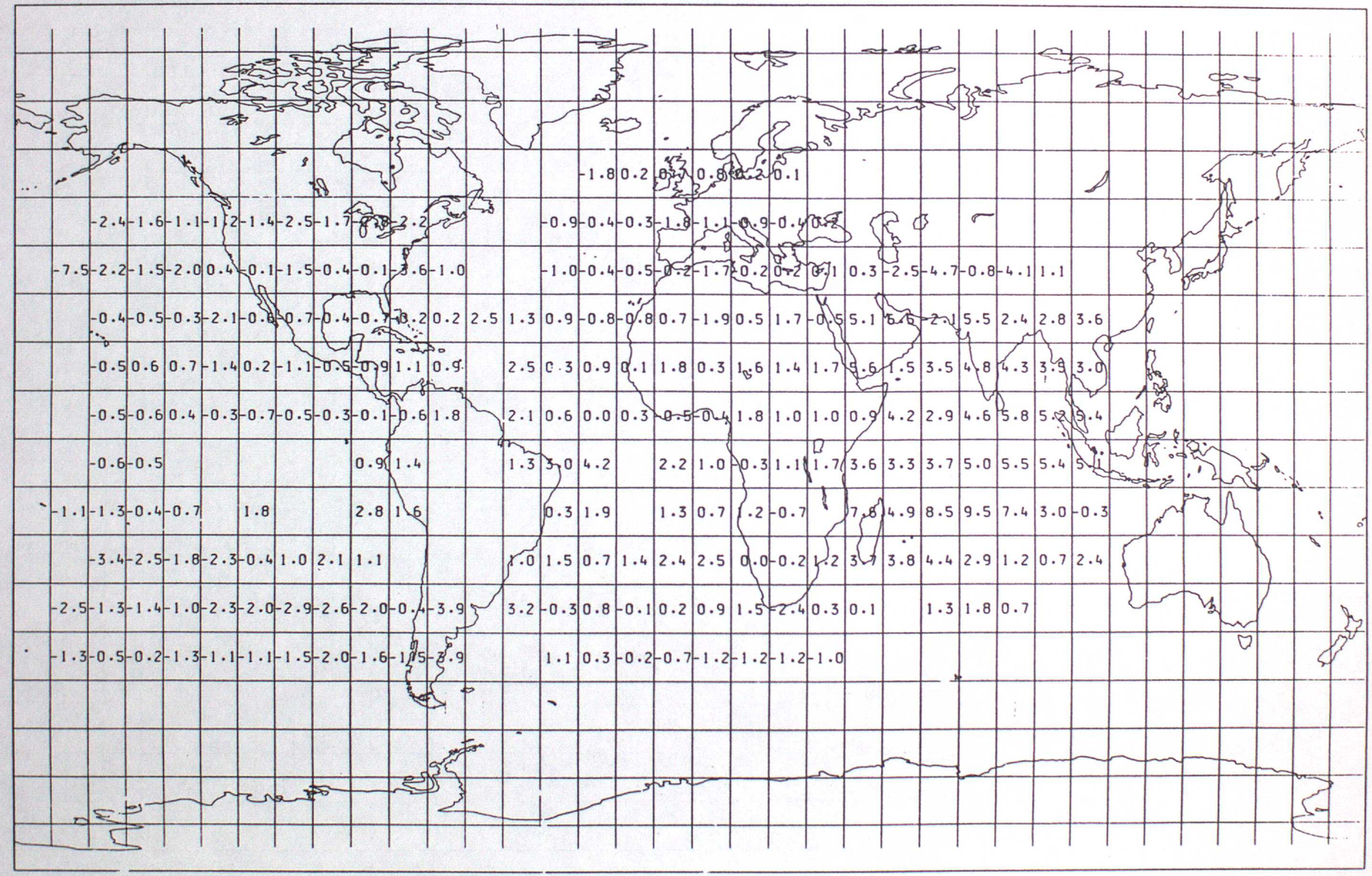

→ REPRESENTS 10 M/S

SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 401-700 HPA
OCTOBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

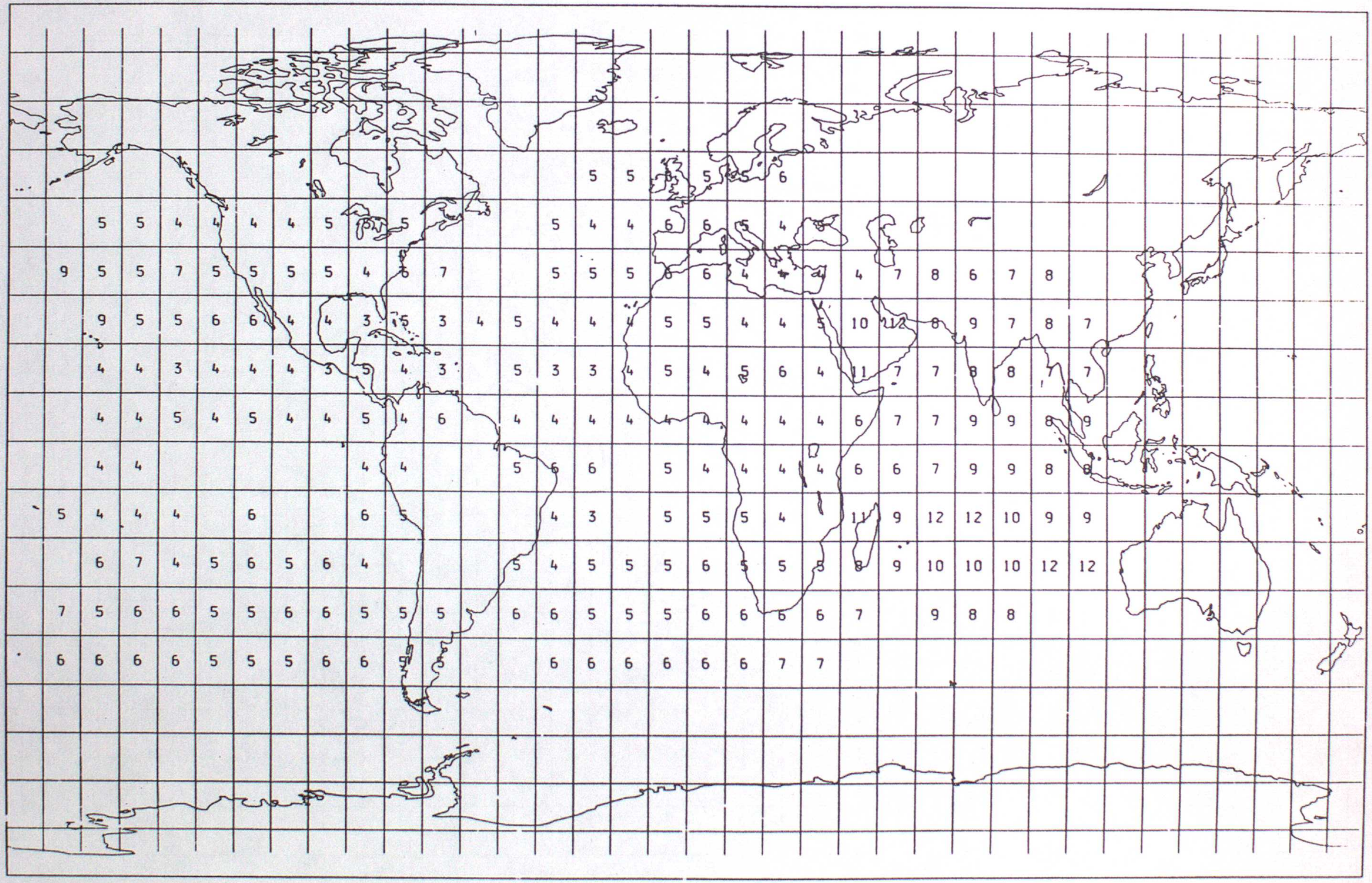
FIGURE 17


→ REPRESENTS 5 M/S

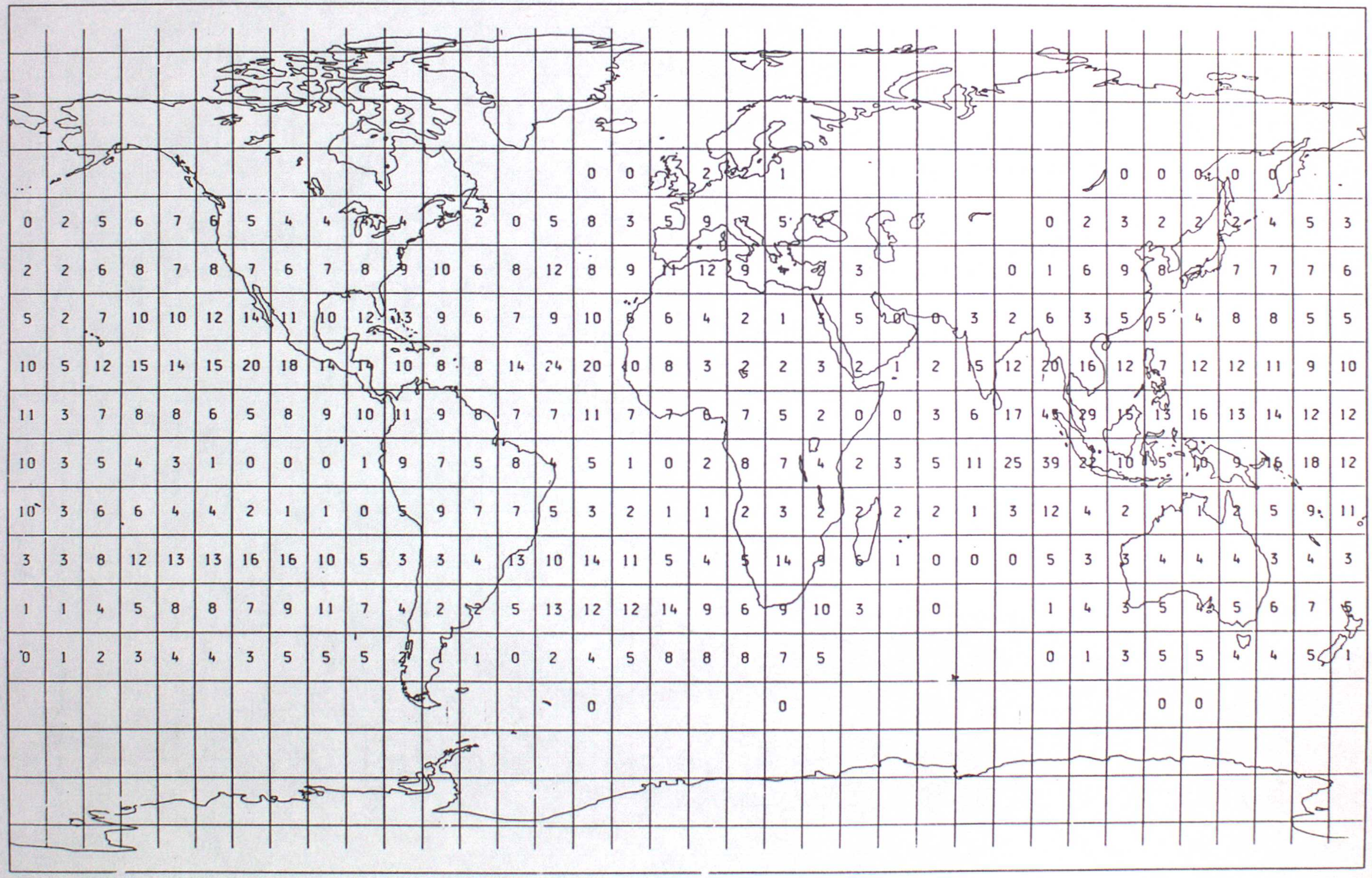
SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 18
OCTOBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


-1.8 0.2 0.7 0.8 -0.2 0.1
-2.4 -1.6 -1.1 -1.2 -1.4 -2.5 -1.7 -2.8 -2.2 -0.9 -0.4 -0.3 -1.8 -1.1 -0.9 -0.4 0.2
-7.5 -2.2 -1.5 -2.0 0.4 -0.1 -1.5 -0.4 -0.1 -3.6 -1.0 -1.0 -0.4 -0.5 -0.2 -1.7 -0.2 0.2 0.1 0.3 -2.5 -4.7 -0.8 -4.1 1.1
-0.4 -0.5 -0.3 -2.1 -0.6 -0.7 -0.4 -0.7 -0.2 0.2 2.5 1.3 0.9 -0.8 -0.8 0.7 -1.9 0.5 1.7 -0.5 5.1 6.6 -2.1 5.5 2.4 2.8 3.6
-0.5 0.6 0.7 -1.4 0.2 -1.1 -0.5 -0.9 1.1 0.9 2.5 0.3 0.9 0.1 1.8 0.3 1.6 1.4 1.7 5.6 1.5 3.5 4.8 4.3 3.5 3.0
-0.5 -0.6 0.4 -0.3 -0.7 -0.5 -0.3 -0.1 -0.6 1.8 2.1 0.6 0.0 0.3 -0.5 -0.4 1.8 1.0 1.0 0.9 4.2 2.9 4.6 5.8 5.2 5.4
-0.6 -0.5 0.9 1.4 1.3 3.0 4.2 2.2 1.0 -0.3 1.1 1.7 3.6 3.3 3.7 5.0 5.5 5.4 5.1
-1.1 -1.3 -0.4 -0.7 1.8 2.8 1.6 0.3 1.9 1.3 0.7 1.2 -0.7 7.8 4.9 8.5 9.5 7.4 3.0 -0.3
-3.4 -2.5 -1.8 -2.3 -0.4 1.0 2.1 1.1 1.0 1.5 0.7 1.4 2.4 2.5 0.0 -0.2 1.2 3.7 3.8 4.4 2.9 1.2 0.7 2.4
-2.5 -1.3 -1.4 -1.0 -2.3 -2.0 -2.9 -2.6 -2.0 -0.4 -3.9 3.2 -0.3 0.8 -0.1 0.2 0.9 1.5 -2.4 0.3 0.1 1.3 1.8 0.7
-1.3 -0.5 -0.2 -1.3 -1.1 -1.1 -1.5 -2.0 -1.6 -1.5 -3.9 1.1 0.3 -0.2 -0.7 -1.2 -1.2 -1.2 -1.0

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 401 AND 700 HPA FIGURE 19
OCTOBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT

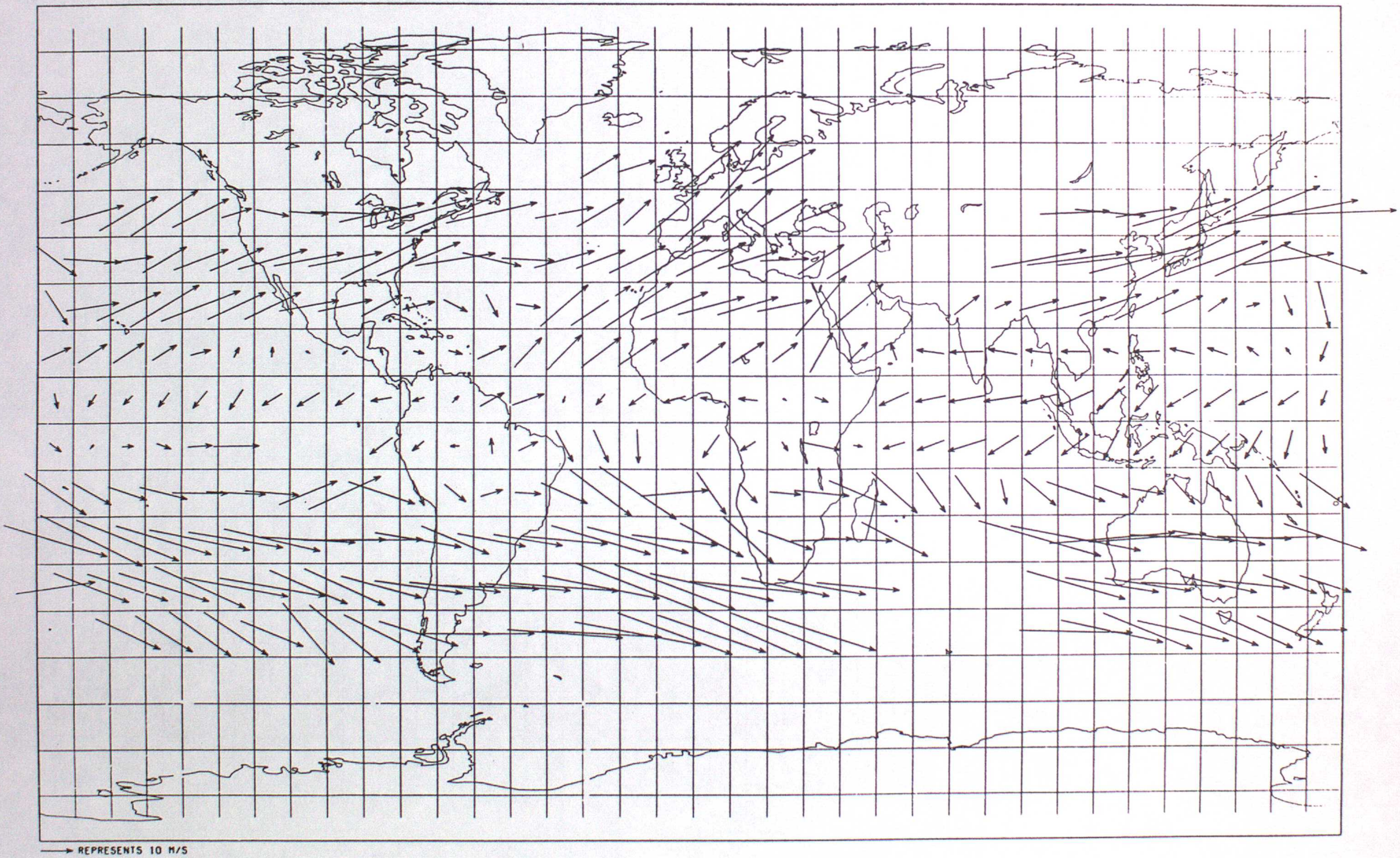

5 5 5 5 6
5 5 4 4 4 4 5 5 5 4 4 6 6 5 4
9 5 5 7 5 5 5 5 4 6 7 5 5 5 6 6 4 4 4 4 7 8 6 7 8
9 5 5 6 6 4 4 3 5 3 4 5 4 4 4 5 5 4 4 5 10 12 8 9 7 8 7
4 4 3 4 4 4 3 5 4 3 5 3 3 4 5 4 5 6 4 11 7 7 8 8 7 7
4 4 5 4 5 4 4 5 4 6 4 4 4 4 4 4 4 4 4 6 7 7 9 9 8 9
4 4 4 4 5 6 6 5 4 4 4 4 6 6 7 9 9 8 8
5 4 4 4 6 6 5 4 3 5 5 5 4 11 9 12 12 10 9 9
6 7 4 5 6 5 6 4 5 4 5 5 5 6 5 5 5 8 9 10 10 10 12 12
7 5 6 6 5 5 6 6 5 5 5 6 6 5 5 5 6 6 6 6 7 9 8 8
6 6 6 6 5 5 5 6 6 5 5 6 6 6 6 6 6 7 7

AVERAGE DAILY NUMBER OF SATOB OBSERVATIONS BETWEEN 101 AND 400 HPA FIGURE 20
OCTOBER 1993


0 0 2 2 1 0 0 0 0 0
0 2 5 6 7 6 5 4 4 4 4 2 0 5 8 3 5 9 7 5 2 0 2 3 2 2 2 4 5 3
2 2 6 8 7 8 7 6 7 8 9 10 6 8 12 8 9 11 12 9 2 3 0 1 6 9 8 7 7 7 7 6
5 2 7 10 10 12 14 11 10 12 13 9 6 7 9 10 6 6 4 2 1 3 5 0 0 3 2 6 3 5 5 4 8 8 5 5
10 5 12 15 14 15 20 18 14 14 10 8 8 14 24 20 10 8 3 2 2 3 2 1 2 15 12 20 16 12 7 12 12 11 9 10
11 3 7 8 8 6 5 8 9 10 11 9 8 7 7 11 7 7 8 7 5 2 0 0 3 6 17 45 29 15 13 16 13 14 12 12
10 3 5 4 3 1 0 0 0 1 9 7 5 8 4 5 1 0 2 8 7 4 2 3 5 11 25 39 22 10 5 10 9 16 18 12
10 3 6 6 4 4 2 1 1 0 5 9 7 7 5 3 2 1 1 2 3 2 2 2 2 1 3 12 4 2 1 1 2 5 9 11
3 3 8 12 13 13 16 16 10 5 3 3 4 13 10 14 11 5 4 5 14 9 6 1 0 0 0 5 3 3 4 4 4 3 4 3
1 1 4 5 8 8 7 9 11 7 4 2 2 5 13 12 12 14 9 6 9 10 3 0 1 4 3 5 4 5 6 7 5
0 1 2 3 4 4 3 5 5 5 2 1 1 0 2 4 5 8 8 8 7 5 0 1 3 5 5 4 4 5 1
0 0 0 0

SATOB VECTOR MEAN WINDS BETWEEN 101-400 HPA
OCTOBER 1993
ALL OBSERVATIONS
ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

FIGURE 21


REPRESENTS 10 M/S

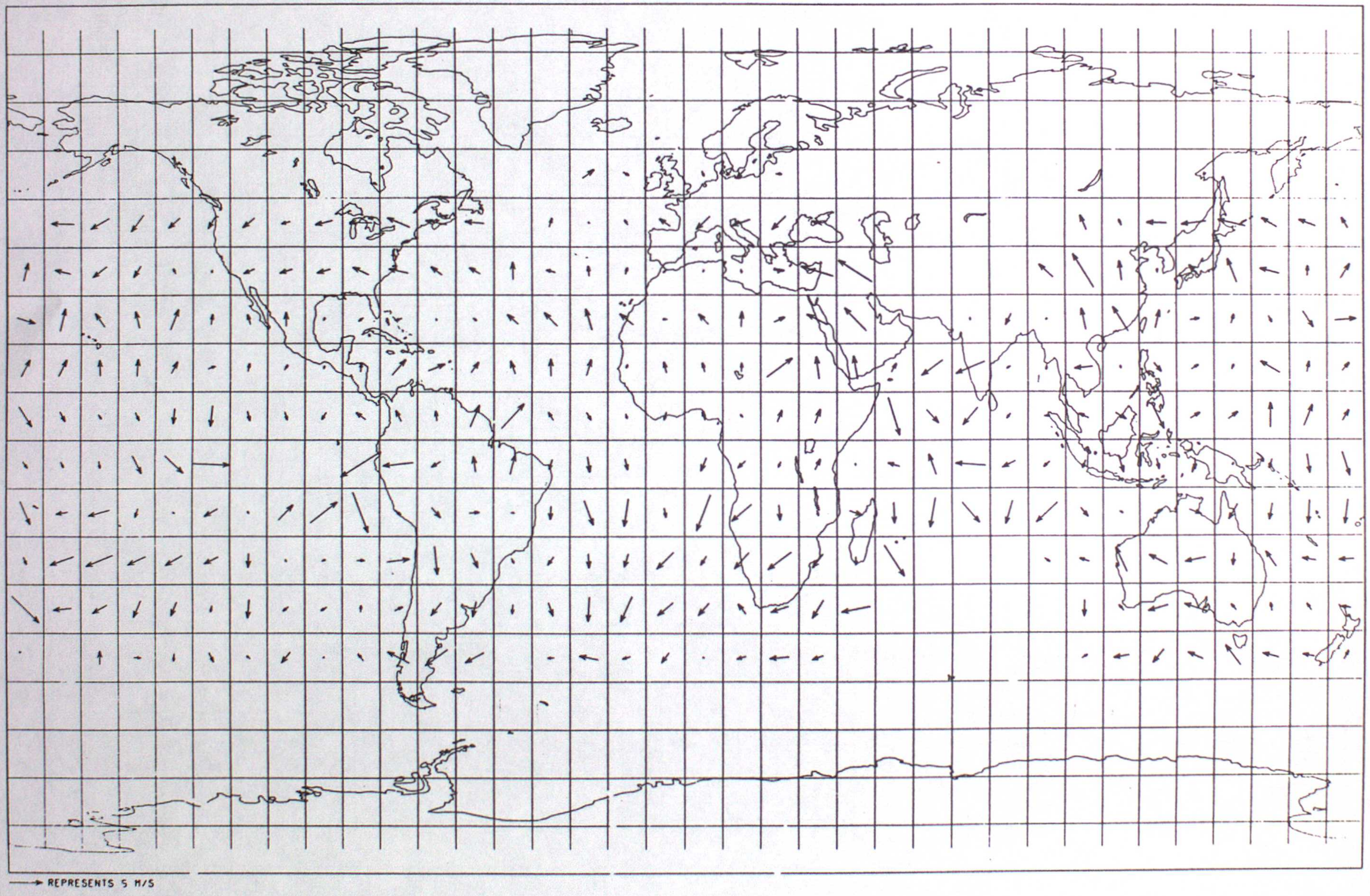
SATOB O-B VECTOR WIND DIFFERENCES BETWEEN 101-400 HPA

OCTOBER 1993

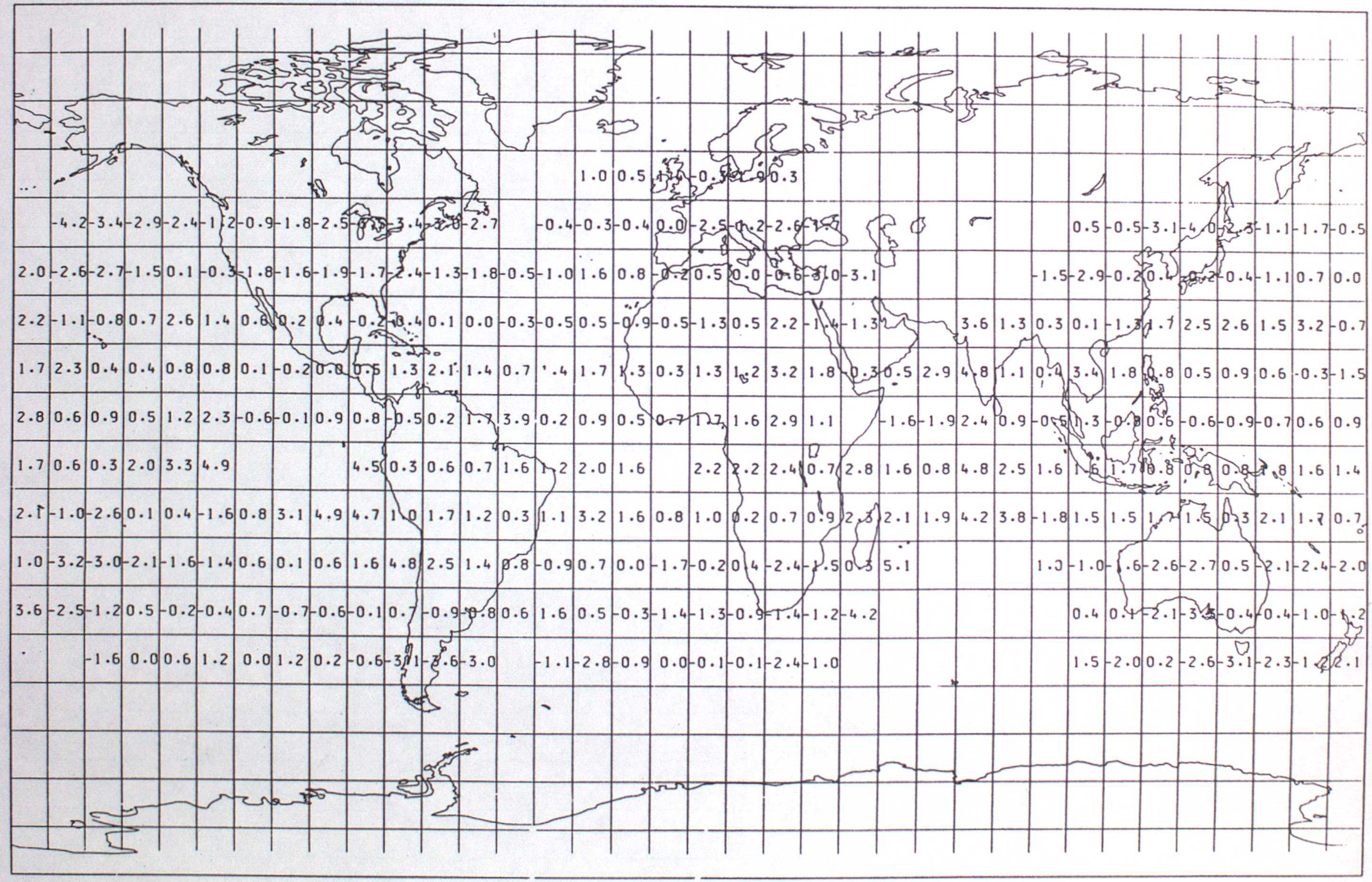
ALL OBSERVATIONS

ARROWS PLOTTED WHERE > 10 OBS ARE PRESENT

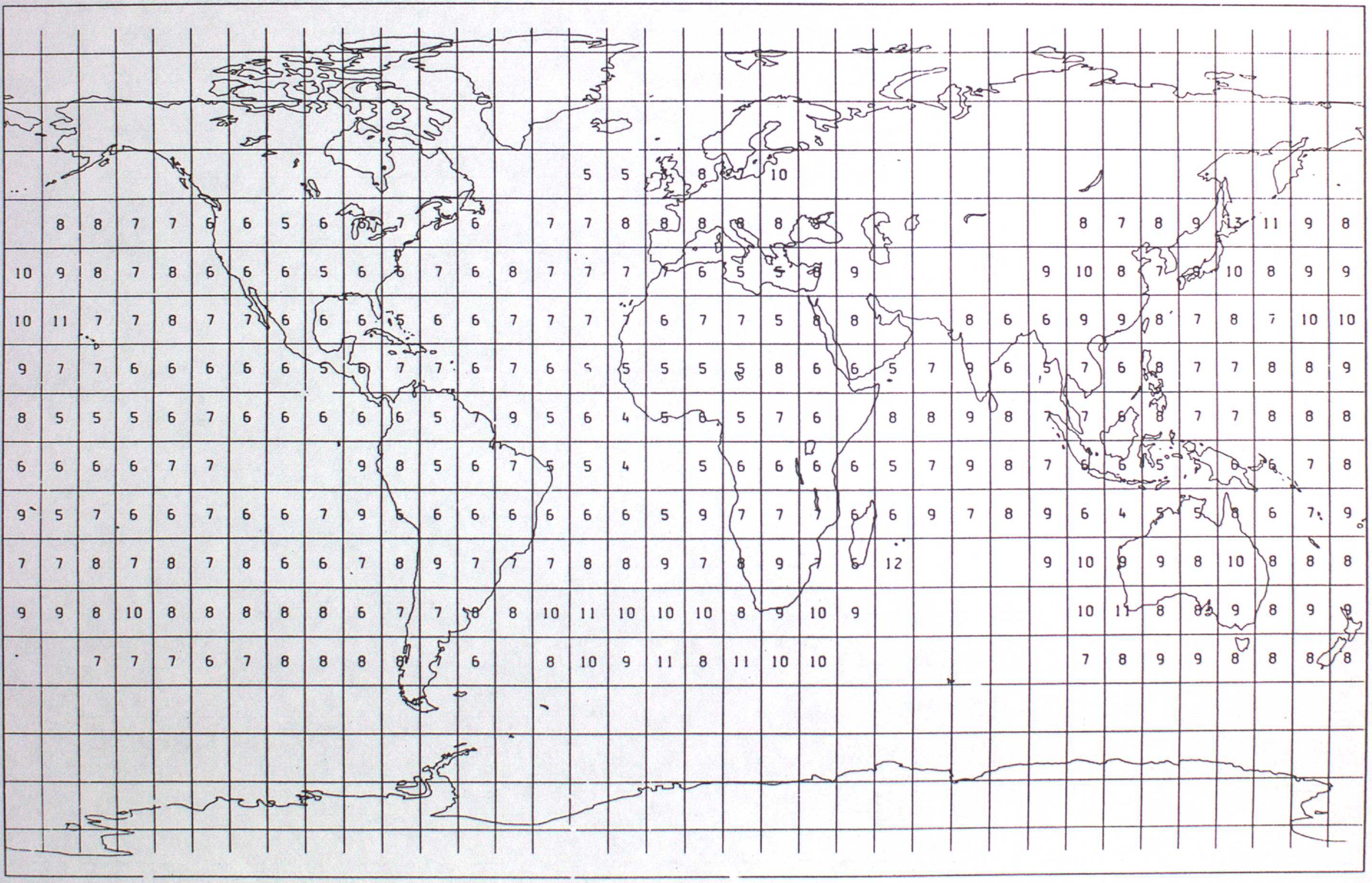
FIGURE 22


REPRESENTS 5 M/S

SATOBS : MEAN O-B SPEED DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA   FIGURE 23
OCTOBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


1.0 0.5 1.4 -0.3 -1.9 0.3
-4.2 -3.4 -2.9 -2.4 -1.2 -0.9 -1.8 -2.5 -0.5 -3.4 -3.0 -2.7 -0.4 -0.3 -0.4 0.0 -2.5 -1.2 -2.6 -1.7 0.5 -0.5 -3.1 -4.0 -2.3 -1.1 -1.7 -0.5
2.0 -2.6 -2.7 -1.5 0.1 -0.3 -1.8 -1.6 -1.9 -1.7 -2.4 -1.3 -1.8 -0.5 -1.0 1.6 0.8 -0.2 0.5 0.0 -0.6 -3.0 -3.1 -1.5 -2.9 -0.2 0.4 -0.2 -0.4 -1.1 0.7 0.0
2.2 -1.1 -0.8 0.7 2.6 1.4 0.6 0.2 0.4 -0.2 -0.4 0.1 0.0 -0.3 -0.5 0.5 -0.9 -0.5 -1.3 0.5 2.2 -1.4 -1.3 3.6 1.3 0.3 0.1 -1.3 1.7 2.5 2.6 1.5 3.2 -0.7
1.7 2.3 0.4 0.4 0.8 0.8 0.1 -0.2 0.0 0.5 1.3 2.1 1.4 0.7 1.4 1.7 1.3 0.3 1.3 1.2 3.2 1.8 -0.3 0.5 2.9 4.8 1.1 0.4 3.4 1.8 0.8 0.5 0.9 0.6 -0.3 -1.5
2.8 0.6 0.9 0.5 1.2 2.3 -0.6 -0.1 0.9 0.8 -0.5 0.2 1.7 3.9 0.2 0.9 0.5 0.7 1.7 1.6 2.9 1.1 -1.6 -1.9 2.4 0.9 -0.5 1.3 -0.8 0.6 -0.6 -0.9 -0.7 0.6 0.9
1.7 0.6 0.3 2.0 3.3 4.9 4.5 0.3 0.6 0.7 1.6 1.2 2.0 1.6 2.2 2.2 2.4 0.7 2.8 1.6 0.8 4.8 2.5 1.6 1.6 1.7 0.8 0.8 0.8 1.8 1.6 1.4
2.1 -1.0 -2.6 0.1 0.4 -1.6 0.8 3.1 4.9 4.7 1.0 1.7 1.2 0.3 1.1 3.2 1.6 0.8 1.0 0.2 0.7 0.9 2.3 2.1 1.9 4.2 3.8 -1.8 1.5 1.5 1.7 1.5 0.3 2.1 1.7 0.7
1.0 -3.2 -3.0 -2.1 -1.6 -1.4 0.6 0.1 0.6 1.6 4.8 2.5 1.4 0.8 -0.9 0.7 0.0 -1.7 -0.2 0.4 -2.4 -1.5 0.3 5.1 1.0 -1.0 -1.6 -2.6 -2.7 0.5 -2.1 -2.4 -2.0
3.6 -2.5 -1.2 0.5 -0.2 -0.4 0.7 -0.7 -0.6 -0.1 0.7 -0.9 -0.8 0.6 1.6 0.5 -0.3 -1.4 -1.3 -0.9 -1.4 -1.2 -4.2 0.4 0.4 -2.1 -3.3 -0.4 -0.4 -1.0 -1.2
-1.6 0.0 0.6 1.2 0.0 1.2 0.2 -0.6 -3.1 -3.6 -3.0 -1.1 -2.8 -0.9 0.0 -0.1 -0.1 -2.4 -1.0 1.5 -2.0 0.2 -2.6 -3.1 -2.3 -1.2 2.1

SATOBS : RMS O-B VECTOR DIFFERENCES (M/S) BETWEEN 101 AND 400 HPA FIGURE 24
OCTOBER 1993
USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 10 OBS ARE PRESENT


5 5 8 10
8 8 7 7 6 6 5 6 6 7 7 6 7 7 8 8 8 8 8 8 7 8 9 13 11 9 8
10 9 8 7 8 6 6 6 5 6 6 7 6 8 7 7 7 7 6 5 5 8 9 9 10 8 7 9 10 8 9 9
10 11 7 7 8 7 7 6 6 6 5 6 6 7 7 7 7 6 7 7 5 8 8 8 6 6 9 9 8 7 8 7 10 10
9 7 7 6 6 6 6 6 5 6 7 7 6 7 6 5 5 5 5 5 8 6 6 5 7 9 6 5 7 6 8 7 7 8 8 9
8 5 5 5 6 7 6 6 6 6 6 5 7 9 5 6 4 5 8 5 7 6 8 8 9 8 7 7 6 8 7 7 8 8 8
6 6 6 6 7 7 9 8 5 6 7 5 5 4 5 6 6 6 6 5 7 9 8 7 6 6 5 5 6 6 7 8
9 5 7 6 6 7 6 6 7 9 6 6 6 6 6 6 6 5 9 7 7 7 6 6 9 7 8 9 6 4 5 5 8 6 7 9
7 7 8 7 8 7 8 6 6 7 8 9 7 7 7 8 8 9 7 8 9 7 6 12 9 10 9 9 8 10 8 8 8
9 9 8 10 8 8 8 8 8 6 7 7 8 8 10 11 10 10 10 8 9 10 9 10 11 8 8 9 8 9 9
7 7 7 6 7 8 8 8 8 7 6 8 10 9 11 8 11 10 10 7 8 9 9 8 8 8 8

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

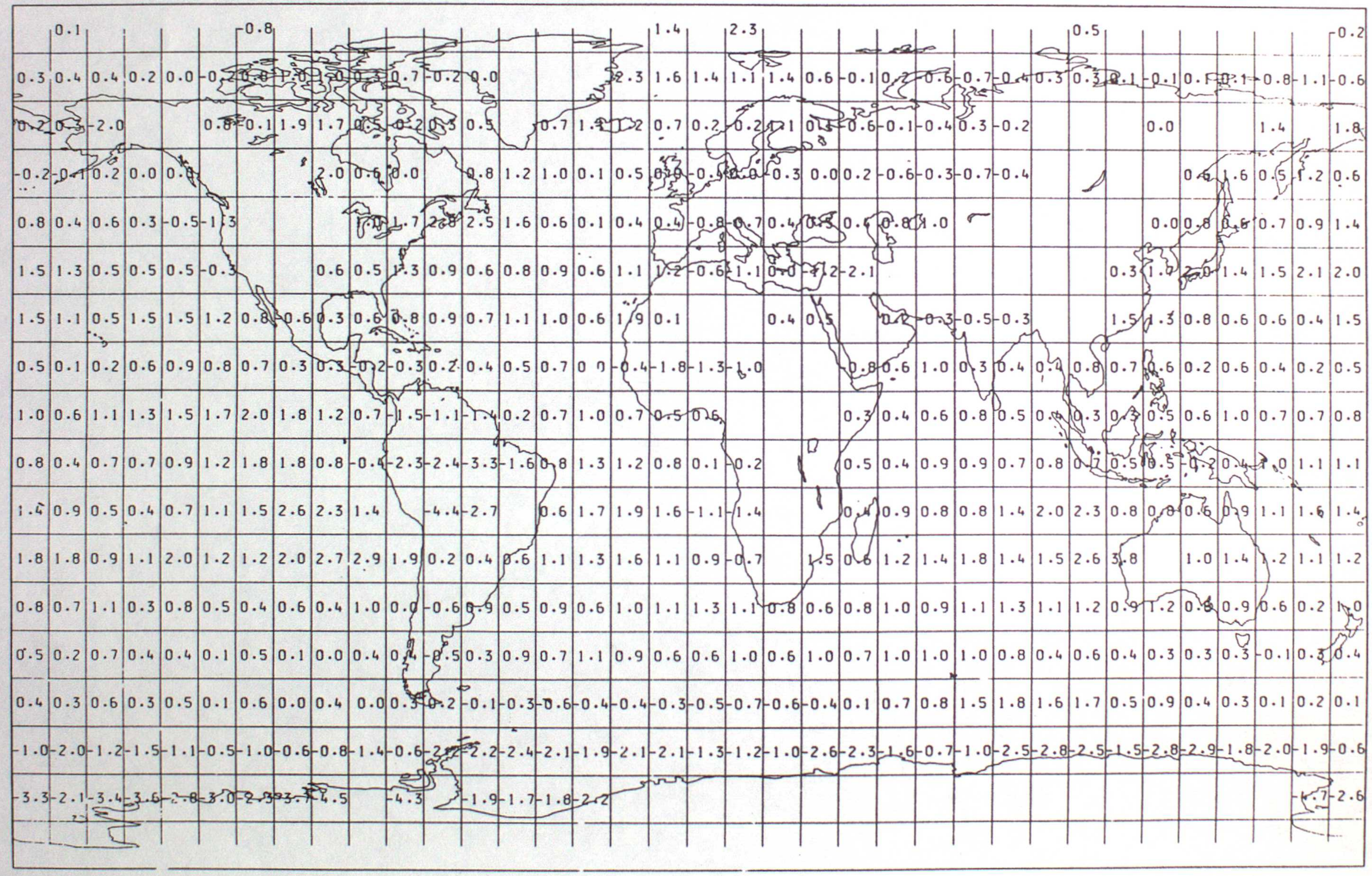
MONTH:October, 93

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from NOAA-11, NOAA-12 500 km.
Standard of comparison	:Background field from Bracknell global model.
Selection Criteria	:All SATEM soundings where number of observations > 30.
Data Extracted	:Layer: 850 - 1000 hPa 100 - 300 hPa 30 - 50 hPa
	:Mean observation minus background temperature differences

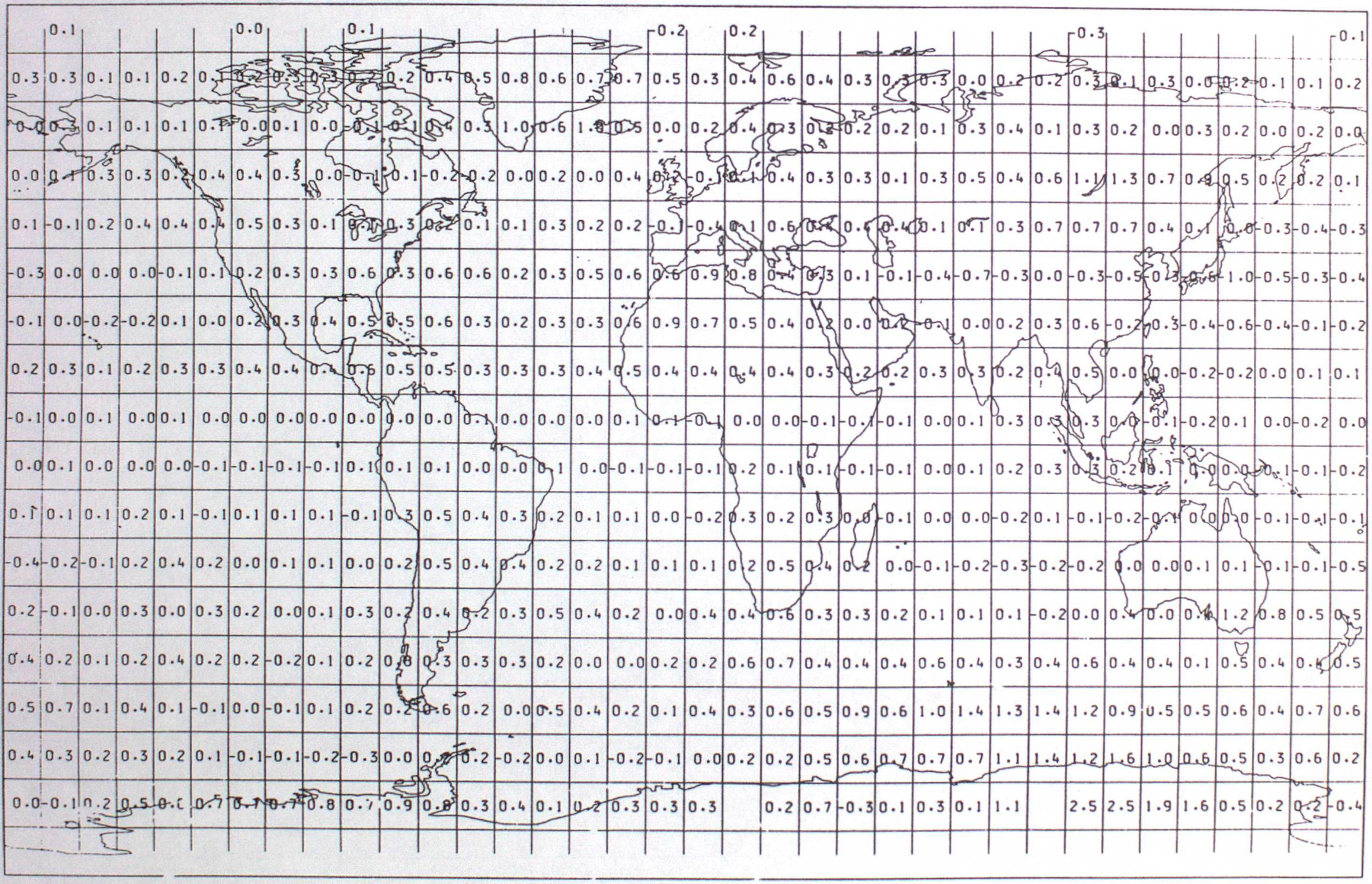
500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 850 TO 1000 HPA
OCTOBER 1993
NOAA-11, USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 25

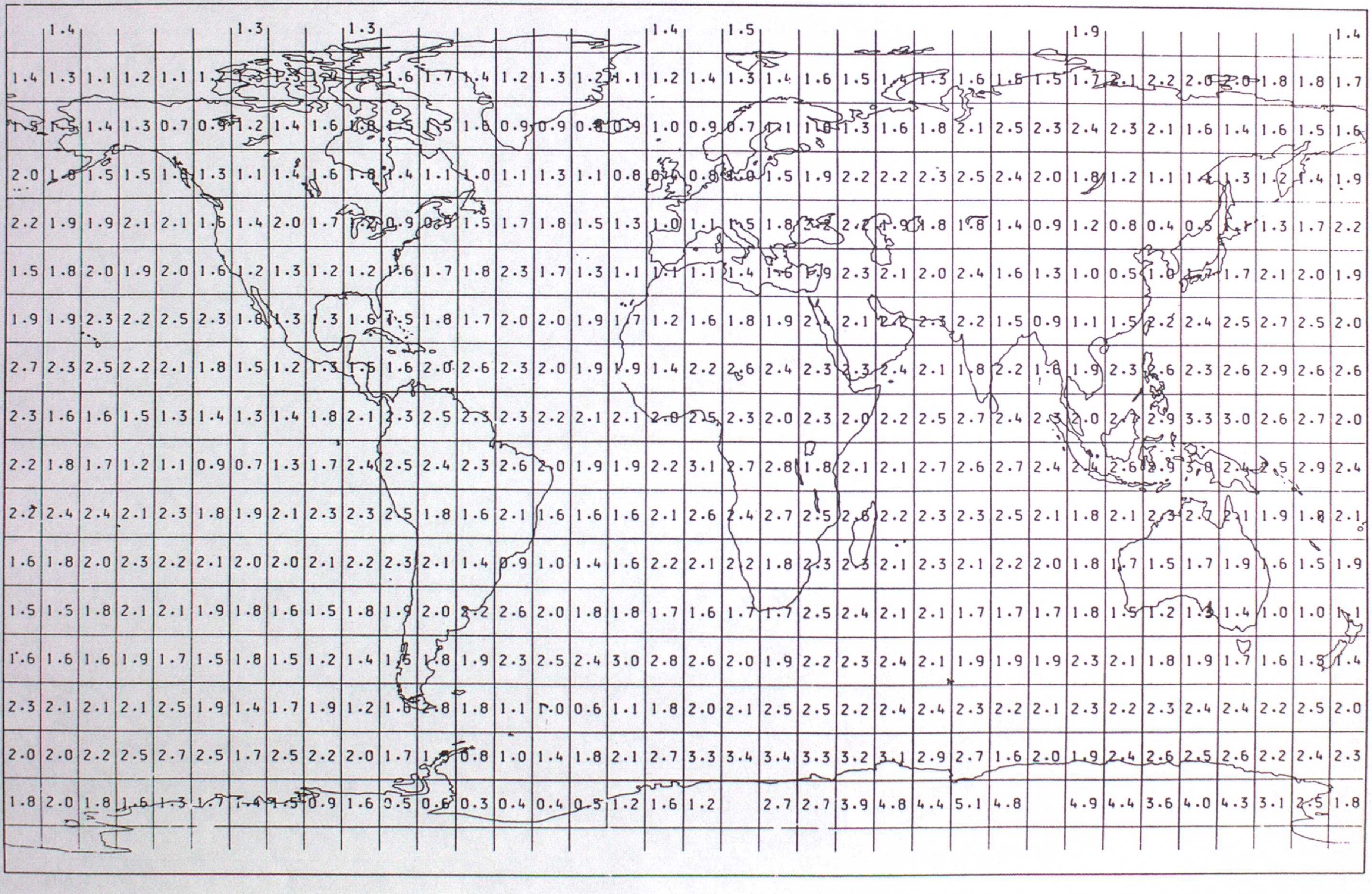

0.1 -0.8 1.4 2.3 0.5 -0.2
0.3 0.4 0.4 0.2 0.0 -0.2 0.7 -0.2 0.0 2.3 1.6 1.4 1.1 1.4 0.6 -0.1 0.2 -0.6 -0.7 -0.4 0.3 0.3 -0.1 0.1 -0.8 -1.1 -0.6
0.2 0.3 -2.0 0.8 -0.1 1.9 1.7 0.5 -0.2 0.3 0.5 0.7 1.3 1.2 0.7 0.2 -0.2 1.1 0.5 -0.6 -0.1 -0.4 0.3 -0.2 0.0 1.4 1.8
-0.2 -0.1 0.2 0.0 0.1 2.0 0.6 0.0 0.8 1.2 1.0 0.1 0.5 0.0 -0.3 0.0 0.2 -0.6 -0.3 -0.7 -0.4 0.6 1.6 0.5 1.2 0.6
0.8 0.4 0.6 0.3 -0.5 -1.3 1.0 1.7 2.8 2.5 1.6 0.6 0.1 0.4 0.4 -0.8 -0.7 0.4 0.3 0.4 0.8 1.0 0.0 0.8 0.6 0.7 0.9 1.4
1.5 1.3 0.5 0.5 0.5 -0.3 0.6 0.5 1.3 0.9 0.6 0.8 0.9 0.6 1.1 1.2 -0.6 1.1 0.0 -2.2 -2.1 0.3 1.7 2.0 1.4 1.5 2.1 2.0
1.5 1.1 0.5 1.5 1.5 1.2 0.8 0.6 0.3 0.6 0.8 0.9 0.7 1.1 1.0 0.6 1.9 0.1 0.4 0.5 0.2 -0.3 -0.5 -0.3 1.5 1.3 0.8 0.6 0.6 0.4 1.5
0.5 0.1 0.2 0.6 0.9 0.8 0.7 0.3 0.3 -0.2 -0.3 0.2 0.4 0.5 0.7 0.0 -0.4 -1.8 -1.3 -1.0 0.8 0.6 1.0 0.3 0.4 0.4 0.8 0.7 0.6 0.2 0.6 0.4 0.2 0.5
1.0 0.6 1.1 1.3 1.5 1.7 2.0 1.8 1.2 0.7 -1.5 -1.1 -1.4 0.2 0.7 1.0 0.7 0.5 0.6 0.3 0.4 0.6 0.8 0.5 0.4 0.3 0.3 0.5 0.6 1.0 0.7 0.7 0.8
0.8 0.4 0.7 0.7 0.9 1.2 1.8 1.8 0.8 -0.4 -2.3 -2.4 -3.3 -1.6 0.8 1.3 1.2 0.8 0.1 0.2 0.5 0.4 0.9 0.9 0.7 0.8 0.7 0.5 0.5 -0.2 0.4 1.0 1.1 1.1
1.4 0.9 0.5 0.4 0.7 1.1 1.5 2.6 2.3 1.4 -4.4 -2.7 0.6 1.7 1.9 1.6 -1.1 -1.4 0.4 0.9 0.8 0.8 1.4 2.0 2.3 0.8 0.0 0.6 0.9 1.1 1.6 1.4
1.8 1.8 0.9 1.1 2.0 1.2 1.2 2.0 2.7 2.9 1.9 0.2 0.4 0.6 1.1 1.3 1.6 1.1 0.9 -0.7 1.5 0.6 1.2 1.4 1.8 1.4 1.5 2.6 3.8 1.0 1.4 1.2 1.1 1.2
0.8 0.7 1.1 0.3 0.8 0.5 0.4 0.6 0.4 1.0 0.0 -0.6 0.9 0.5 0.9 0.6 1.0 1.1 1.3 1.1 0.8 0.6 0.8 1.0 0.9 1.1 1.3 1.1 1.2 0.9 1.2 0.8 0.9 0.6 0.2 1.0
0.5 0.2 0.7 0.4 0.4 0.1 0.5 0.1 0.0 0.4 0.4 -0.5 0.3 0.9 0.7 1.1 0.9 0.6 0.6 1.0 0.6 1.0 0.7 1.0 1.0 1.0 0.8 0.4 0.6 0.4 0.3 0.3 0.3 -0.1 0.3 0.4
0.4 0.3 0.6 0.3 0.5 0.1 0.6 0.0 0.4 0.0 0.3 0.2 -0.1 -0.3 -0.6 -0.4 -0.4 -0.3 -0.5 -0.7 -0.6 -0.4 0.1 0.7 0.8 1.5 1.8 1.6 1.7 0.5 0.9 0.4 0.3 0.1 0.2 0.1
-1.0 -2.0 -1.2 -1.5 -1.1 -0.5 -1.0 -0.6 -0.8 -1.4 -0.6 -2.2 -2.2 -2.4 -2.1 -1.9 -2.1 -2.1 -1.3 -1.2 -1.0 -2.6 -2.3 -1.6 -0.7 -1.0 -2.5 -2.8 -2.5 -1.5 -2.8 -2.9 -1.8 -2.0 -1.9 -0.6
-3.3 -2.1 -3.4 -3.6 -2.8 -3.0 -2.9 -3.7 -4.5 -4.3 -1.9 -1.7 -1.8 -2.2 -4.7 -2.6

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 100 TO 300 HPA
OCTOBER 1993
NOAA-11. USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 26

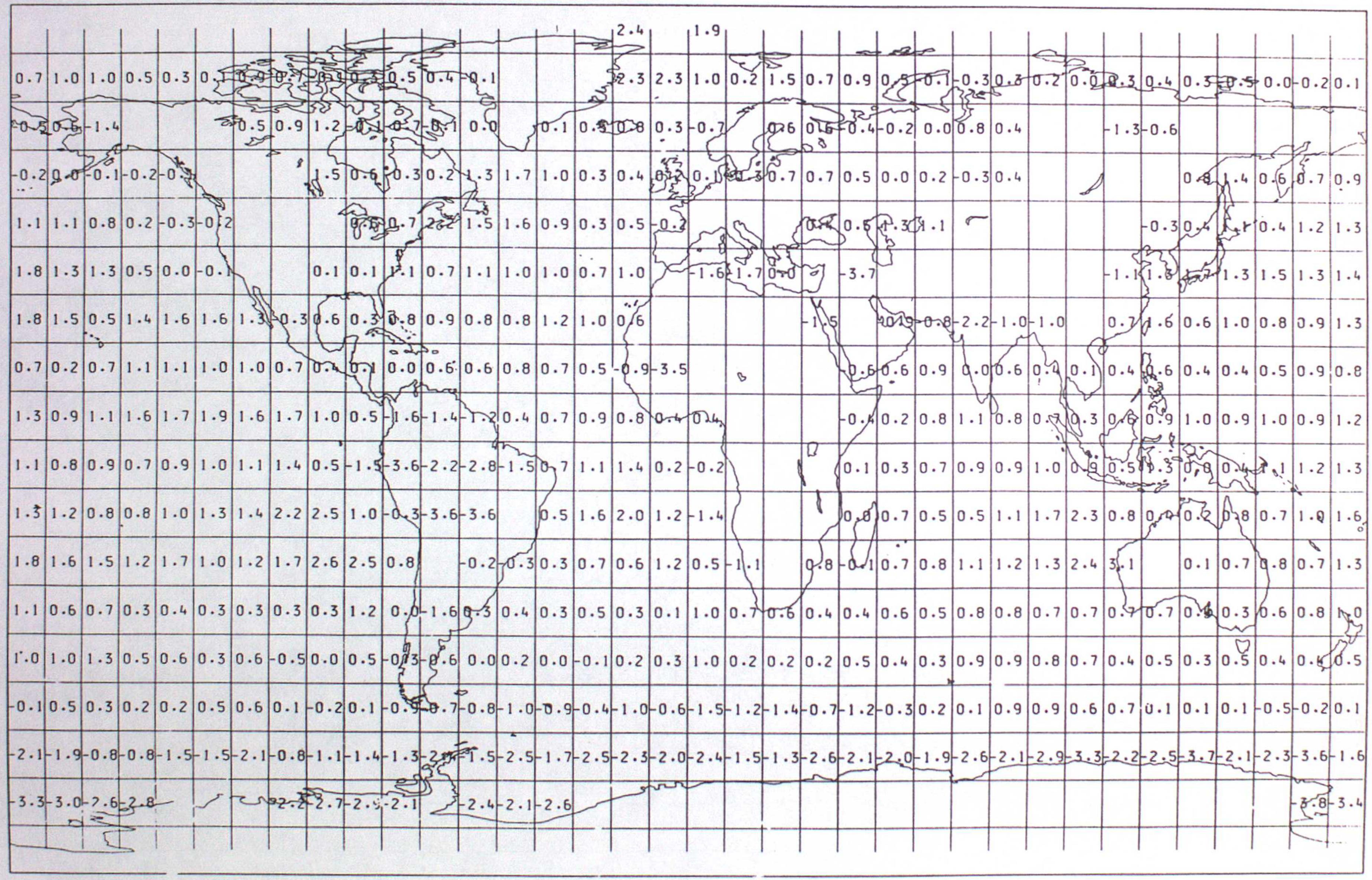

0.1 0.0 0.1 -0.2 0.2 -0.3 -0.1
0.3 0.3 0.1 0.1 0.2 0.1 0.2 0.3 0.3 0.2 0.2 0.4 0.5 0.8 0.6 0.7 0.7 0.5 0.3 0.4 0.6 0.4 0.3 0.3 0.3 0.0 0.2 0.2 0.3 0.1 0.3 0.0 0.2 -0.1 0.1 0.2
0.0 0.3 0.1 0.1 0.1 0.1 0.0 0.1 0.0 -0.1 -0.1 0.4 0.3 1.0 0.6 1.8 0.5 0.0 0.2 0.4 0.3 0.3 -0.2 0.2 0.1 0.3 0.4 0.1 0.3 0.2 0.0 0.3 0.2 0.0 0.2 0.0
0.0 0.1 0.3 0.3 0.2 0.4 0.4 0.3 0.0 -0.1 0.1 -0.2 -0.2 0.0 0.2 0.0 0.4 0.2 -0.1 0.1 0.4 0.3 0.3 0.1 0.3 0.5 0.4 0.6 1.1 1.3 0.7 0.8 0.5 0.2 0.2 0.1
0.1 -0.1 0.2 0.4 0.4 0.4 0.5 0.3 0.1 0.1 0.3 0.2 0.1 0.1 0.3 0.2 0.2 -0.1 -0.4 0.1 0.6 0.4 0.4 0.4 0.1 0.1 0.3 0.7 0.7 0.7 0.4 0.1 0.0 -0.3 -0.4 -0.3
-0.3 0.0 0.0 0.0 -0.1 0.1 0.2 0.3 0.3 0.6 0.3 0.6 0.6 0.2 0.3 0.5 0.6 0.6 0.9 0.8 0.4 0.3 0.1 -0.1 -0.4 -0.7 -0.3 0.0 -0.3 -0.5 -0.3 0.6 -1.0 -0.5 -0.3 -0.4
-0.1 0.0 -0.2 -0.2 0.1 0.0 0.2 0.3 0.4 0.5 0.5 0.6 0.3 0.2 0.3 0.3 0.6 0.9 0.7 0.5 0.4 0.2 0.0 0.2 -0.1 0.0 0.2 0.3 0.6 -0.2 0.3 -0.4 -0.6 -0.4 -0.1 -0.2
0.2 0.3 0.1 0.2 0.3 0.3 0.4 0.4 0.4 0.6 0.5 0.5 0.3 0.3 0.3 0.4 0.5 0.4 0.4 0.4 0.4 0.3 0.2 0.2 0.3 0.3 0.2 0.4 0.5 0.0 0.0 -0.2 -0.2 0.0 0.1 0.1
-0.1 0.0 0.1 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.1 -0.1 -0.1 0.0 0.0 -0.1 -0.1 -0.1 0.0 0.1 0.3 0.3 0.3 0.0 -0.1 -0.2 0.1 0.0 -0.2 0.0
0.0 0.1 0.0 0.0 0.0 -0.1 -0.1 -0.1 -0.1 0.1 0.1 0.1 0.0 0.0 0.1 0.0 -0.1 -0.1 -0.1 0.2 0.1 0.1 -0.1 -0.1 0.0 0.1 0.2 0.3 0.3 0.2 0.1 0.0 0.0 -0.1 -0.1 -0.2
0.1 0.1 0.1 0.2 0.1 -0.1 0.1 0.1 0.1 -0.1 0.3 0.5 0.4 0.3 0.2 0.1 0.1 0.0 -0.2 0.3 0.2 0.3 0.0 -0.1 0.0 0.0 -0.2 0.1 -0.1 -0.2 -0.1 0.0 0.0 -0.1 -0.1 -0.1
-0.4 -0.2 -0.1 0.2 0.4 0.2 0.0 0.1 0.1 0.0 0.2 0.5 0.4 0.4 0.2 0.2 0.1 0.1 0.1 0.2 0.5 0.4 0.2 0.0 -0.1 -0.2 -0.3 -0.2 -0.2 0.0 0.0 0.1 0.1 -0.1 -0.1 -0.5
0.2 -0.1 0.0 0.3 0.0 0.3 0.2 0.0 0.1 0.3 0.2 0.4 0.2 0.3 0.5 0.4 0.2 0.0 0.4 0.4 0.6 0.3 0.3 0.2 0.1 0.1 0.1 -0.2 0.0 0.4 0.0 0.4 1.2 0.8 0.5 0.5
0.4 0.2 0.1 0.2 0.4 0.2 0.2 -0.2 0.1 0.2 0.8 0.3 0.3 0.3 0.2 0.0 0.0 0.2 0.2 0.6 0.7 0.4 0.4 0.4 0.6 0.4 0.3 0.4 0.6 0.4 0.4 0.1 0.5 0.4 0.4 0.5
0.5 0.7 0.1 0.4 0.1 -0.1 0.0 -0.1 0.1 0.2 0.2 0.6 0.2 0.0 0.5 0.4 0.2 0.1 0.4 0.3 0.6 0.5 0.9 0.6 1.0 1.4 1.3 1.4 1.2 0.9 0.5 0.5 0.6 0.4 0.7 0.6
0.4 0.3 0.2 0.3 0.2 0.1 -0.1 -0.1 -0.2 -0.3 0.0 [illegible] 0.2 -0.2 0.0 0.1 -0.2 -0.1 0.0 0.2 0.2 0.5 0.6 0.7 0.7 0.7 1.1 1.4 1.2 1.6 1.0 0.6 0.5 0.3 0.6 0.2
0.0 -0.1 0.2 0.5 [illegible] 0.7 0.7 0.7 0.8 0.7 0.9 0.8 0.3 0.4 0.1 0.2 0.3 0.3 0.3 0.2 0.7 -0.3 0.1 0.3 0.1 1.1 2.5 2.5 1.9 1.6 0.5 0.2 0.2 -0.4

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 30 TO 50 HPA
OCTOBER 1993
FIGURE 27
NOAA-11, USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT



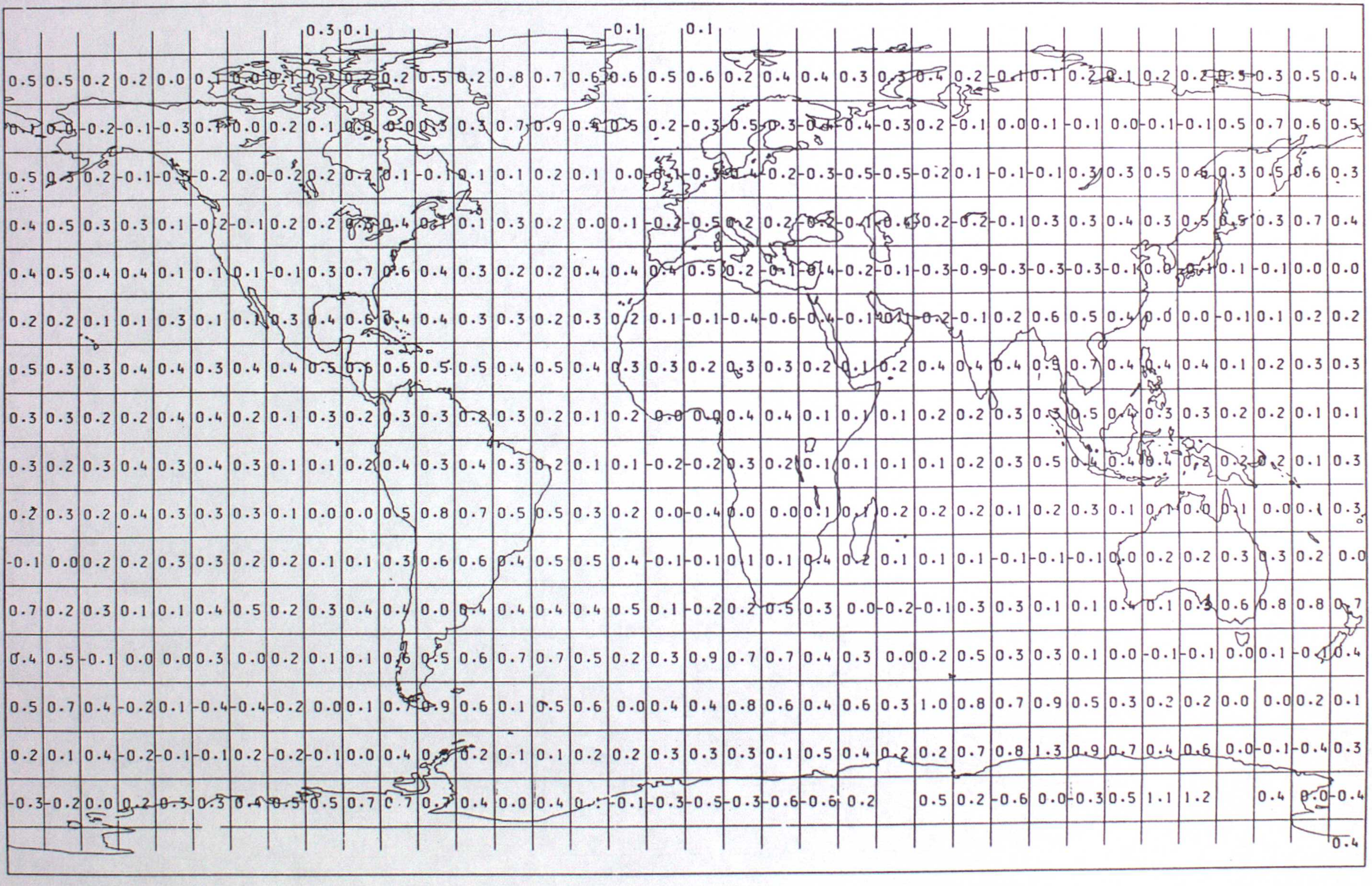
	1.4					1.3			1.3								1.4		1.5									1.9							1.4
1.4	1.3	1.1	1.2	1.1	1.2	1.3	1.3	1.4	1.5	1.6	1.7	1.4	1.2	1.3	1.2	1.1	1.2	1.4	1.3	1.4	1.6	1.5	1.4	1.3	1.6	1.5	1.5	1.7	2.1	2.2	2.0	2.0	1.8	1.8	1.7
1.5	1.5	1.4	1.3	0.7	0.9	1.2	1.4	1.6	1.8	1.5	1.5	1.6	0.9	0.9	0.8	0.9	1.0	0.9	0.7	1.1	1.0	1.3	1.6	1.8	2.1	2.5	2.3	2.4	2.3	2.1	1.6	1.4	1.6	1.5	1.6
2.0	1.8	1.5	1.5	1.8	1.3	1.1	1.4	1.6	1.8	1.4	1.1	1.0	1.1	1.3	1.1	0.8	0.4	0.8	1.0	1.5	1.9	2.2	2.2	2.3	2.5	2.4	2.0	1.8	1.2	1.1	1.4	1.3	1.2	1.4	1.9
2.2	1.9	1.9	2.1	2.1	1.6	1.4	2.0	1.7	1.2	0.9	0.9	1.5	1.7	1.8	1.5	1.3	1.0	1.1	1.5	1.8	2.2	2.2	1.9	1.8	1.8	1.4	0.9	1.2	0.8	0.4	0.5	1.1	1.3	1.7	2.2
1.5	1.8	2.0	1.9	2.0	1.6	1.2	1.3	1.2	1.2	1.6	1.7	1.8	2.3	1.7	1.3	1.1	1.1	1.1	1.4	1.6	1.9	2.3	2.1	2.0	2.4	1.6	1.3	1.0	0.5	1.0	1.7	1.7	2.1	2.0	1.9
1.9	1.9	2.3	2.2	2.5	2.3	1.8	1.3	1.3	1.6	1.5	1.8	1.7	2.0	2.0	1.9	1.7	1.2	1.6	1.8	1.9	2.4	2.1	2.2	2.3	2.2	1.5	0.9	1.1	1.5	2.2	2.4	2.5	2.7	2.5	2.0
2.7	2.3	2.5	2.2	2.1	1.8	1.5	1.2	1.3	1.5	1.6	2.0	2.6	2.3	2.0	1.9	1.9	1.4	2.2	2.6	2.4	2.3	2.3	2.4	2.1	1.8	2.2	1.8	1.9	2.3	2.6	2.3	2.6	2.9	2.6	2.6
2.3	1.6	1.6	1.5	1.3	1.4	1.3	1.4	1.8	2.1	2.3	2.5	2.3	2.3	2.2	2.1	2.1	2.0	2.5	2.3	2.0	2.3	2.0	2.2	2.5	2.7	2.4	2.3	2.0	[illegible]	2.9	3.3	3.0	2.6	2.7	2.0
2.2	1.8	1.7	1.2	1.1	0.9	0.7	1.3	1.7	2.4	2.5	2.4	2.3	2.6	2.0	1.9	1.9	2.2	3.1	2.7	2.8	1.8	2.1	2.1	2.7	2.6	2.7	2.4	2.4	2.6	2.9	3.0	2.4	2.5	2.9	2.4
2.2	2.4	2.4	2.1	2.3	1.8	1.9	2.1	2.3	2.3	2.5	1.8	1.6	2.1	1.6	1.6	1.6	2.1	2.6	2.4	2.7	2.5	2.6	2.2	2.3	2.3	2.5	2.1	1.8	2.1	2.3	2.7	2.1	1.9	1.8	2.1
1.6	1.8	2.0	2.3	2.2	2.1	2.0	2.0	2.1	2.2	2.3	2.1	1.4	0.9	1.0	1.4	1.6	2.2	2.1	2.2	1.8	2.3	2.3	2.1	2.3	2.1	2.2	2.0	1.8	1.7	1.5	1.7	1.9	1.6	1.5	1.9
1.5	1.5	1.8	2.1	2.1	1.9	1.8	1.6	1.5	1.8	1.9	2.0	2.2	2.6	2.0	1.8	1.8	1.7	1.6	1.7	1.7	2.5	2.4	2.1	2.1	1.7	1.7	1.7	1.8	1.5	1.2	1.3	1.4	1.0	1.0	1.1
1.6	1.6	1.6	1.9	1.7	1.5	1.8	1.5	1.2	1.4	1.5	1.8	1.9	2.3	2.5	2.4	3.0	2.8	2.6	2.0	1.9	2.2	2.3	2.4	2.1	1.9	1.9	1.9	2.3	2.1	1.8	1.9	1.7	1.6	1.5	1.4
2.3	2.1	2.1	2.1	2.5	1.9	1.4	1.7	1.9	1.2	1.6	2.8	1.8	1.1	1.0	0.6	1.1	1.8	2.0	2.1	2.5	2.5	2.2	2.4	2.4	2.3	2.2	2.1	2.3	2.2	2.3	2.4	2.4	2.2	2.5	2.0
2.0	2.0	2.2	2.5	2.7	2.5	1.7	2.5	2.2	2.0	1.7	[illegible]	0.8	1.0	1.4	1.8	2.1	2.7	3.3	3.4	3.4	3.3	3.2	3.1	2.9	2.7	1.6	2.0	1.9	2.4	2.6	2.5	2.6	2.2	2.4	2.3
1.8	2.0	1.8	1.6	1.3	1.7	1.4	1.5	0.9	1.6	0.5	0.6	0.3	0.4	0.4	0.5	1.2	1.6	1.2		2.7	2.7	3.9	4.8	4.4	5.1	4.8		4.9	4.4	3.6	4.0	4.3	3.1	2.5	1.8

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 850 TO 1000 HPA
OCTOBER 1993
FIGURE 28
NOAA-12, USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT


2.4 1.9
0.7 1.0 1.0 0.5 0.3 0.1 0.9 0.7 0.1 0.3 0.5 0.4 -0.1 2.3 2.3 1.0 0.2 1.5 0.7 0.9 0.5 -0.1 -0.3 0.3 0.2 0.0 0.3 0.4 0.3 0.5 0.0 -0.2 0.1
-0.5 0.6 -1.4 0.5 0.9 1.2 -0.1 -0.7 -0.1 0.0 0.1 0.5 0.8 0.3 -0.7 0.6 0.6 -0.4 -0.2 0.0 0.8 0.4 -1.3 -0.6
-0.2 0.0 -0.1 -0.2 -0.3 1.5 0.6 -0.3 0.2 1.3 1.7 1.0 0.3 0.4 0.2 0.1 -0.3 0.7 0.7 0.5 0.0 0.2 -0.3 0.4 0.8 1.4 0.6 0.7 0.9
1.1 1.1 0.8 0.2 -0.3 -0.2 0.6 0.7 2.2 1.5 1.6 0.9 0.3 0.5 -0.2 0.4 0.5 1.3 1.1 -0.3 0.4 1.1 0.4 1.2 1.3
1.8 1.3 1.3 0.5 0.0 -0.1 0.1 0.1 1.1 0.7 1.1 1.0 1.0 0.7 1.0 -1.6 1.7 0.0 -3.7 -1.1 1.8 1.7 1.3 1.5 1.3 1.4
1.8 1.5 0.5 1.4 1.6 1.6 1.3 -0.3 0.6 0.3 0.8 0.9 0.8 0.8 1.2 1.0 0.6 -1.5 0.9 -0.8 -2.2 -1.0 -1.0 0.7 1.6 0.6 1.0 0.8 0.9 1.3
0.7 0.2 0.7 1.1 1.1 1.0 1.0 0.7 0.4 0.1 0.0 0.6 0.6 0.8 0.7 0.5 -0.9 -3.5 0.6 0.6 0.9 0.0 0.6 0.4 0.1 0.4 0.6 0.4 0.4 0.5 0.9 0.8
1.3 0.9 1.1 1.6 1.7 1.9 1.6 1.7 1.0 0.5 -1.6 -1.4 -1.2 0.4 0.7 0.9 0.8 0.4 0.4 -0.4 0.2 0.8 1.1 0.8 0.7 0.3 0.6 0.9 1.0 0.9 1.0 0.9 1.2
1.1 0.8 0.9 0.7 0.9 1.0 1.1 1.4 0.5 -1.5 -3.6 -2.2 -2.8 -1.5 0.7 1.1 1.4 0.2 -0.2 0.1 0.3 0.7 0.9 0.9 1.0 0.9 0.5 1.3 0.8 0.4 1.1 1.2 1.3
1.3 1.2 0.8 0.8 1.0 1.3 1.4 2.2 2.5 1.0 -0.3 -3.6 -3.6 0.5 1.6 2.0 1.2 -1.4 0.0 0.7 0.5 0.5 1.1 1.7 2.3 0.8 0.4 0.2 0.8 0.7 1.0 1.6
1.8 1.6 1.5 1.2 1.7 1.0 1.2 1.7 2.6 2.5 0.8 -0.2 -0.3 0.3 0.7 0.6 1.2 0.5 -1.1 0.8 -0.1 0.7 0.8 1.1 1.2 1.3 2.4 3.1 0.1 0.7 0.8 0.7 1.3
1.1 0.6 0.7 0.3 0.4 0.3 0.3 0.3 0.3 1.2 0.0 -1.6 0.3 0.4 0.3 0.5 0.3 0.1 1.0 0.7 0.6 0.4 0.4 0.6 0.5 0.8 0.8 0.7 0.7 0.7 0.7 0.9 0.3 0.6 0.8 1.0
1.0 1.0 1.3 0.5 0.6 0.3 0.6 -0.5 0.0 0.5 -0.3 -0.6 0.0 0.2 0.0 -0.1 0.2 0.3 1.0 0.2 0.2 0.2 0.5 0.4 0.3 0.9 0.9 0.8 0.7 0.4 0.5 0.3 0.5 0.4 0.4 0.5
-0.1 0.5 0.3 0.2 0.2 0.5 0.6 0.1 -0.2 0.1 -0.9 -0.7 -0.8 -1.0 -0.9 -0.4 -1.0 -0.6 -1.5 -1.2 -1.4 -0.7 -1.2 -0.3 0.2 0.1 0.9 0.9 0.6 0.7 0.1 0.1 0.1 -0.5 -0.2 0.1
-2.1 -1.9 -0.8 -0.8 -1.5 -1.5 -2.1 -0.8 -1.1 -1.4 -1.3 -2.4 -1.5 -2.5 -1.7 -2.5 -2.3 -2.0 -2.4 -1.5 -1.3 -2.6 -2.1 -2.0 -1.9 -2.6 -2.1 -2.9 -3.3 -2.2 -2.5 -3.7 -2.1 -2.3 -3.6 -1.6
-3.3 -3.0 -2.6 -2.8 -2.2 -2.7 -2.9 -2.1 -2.4 -2.1 -2.6 -3.8 -3.4

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 100 TO 300 HPA
OCTOBER 1993
NOAA-12, USING ALL OBSERVATIONS
VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT

FIGURE 29

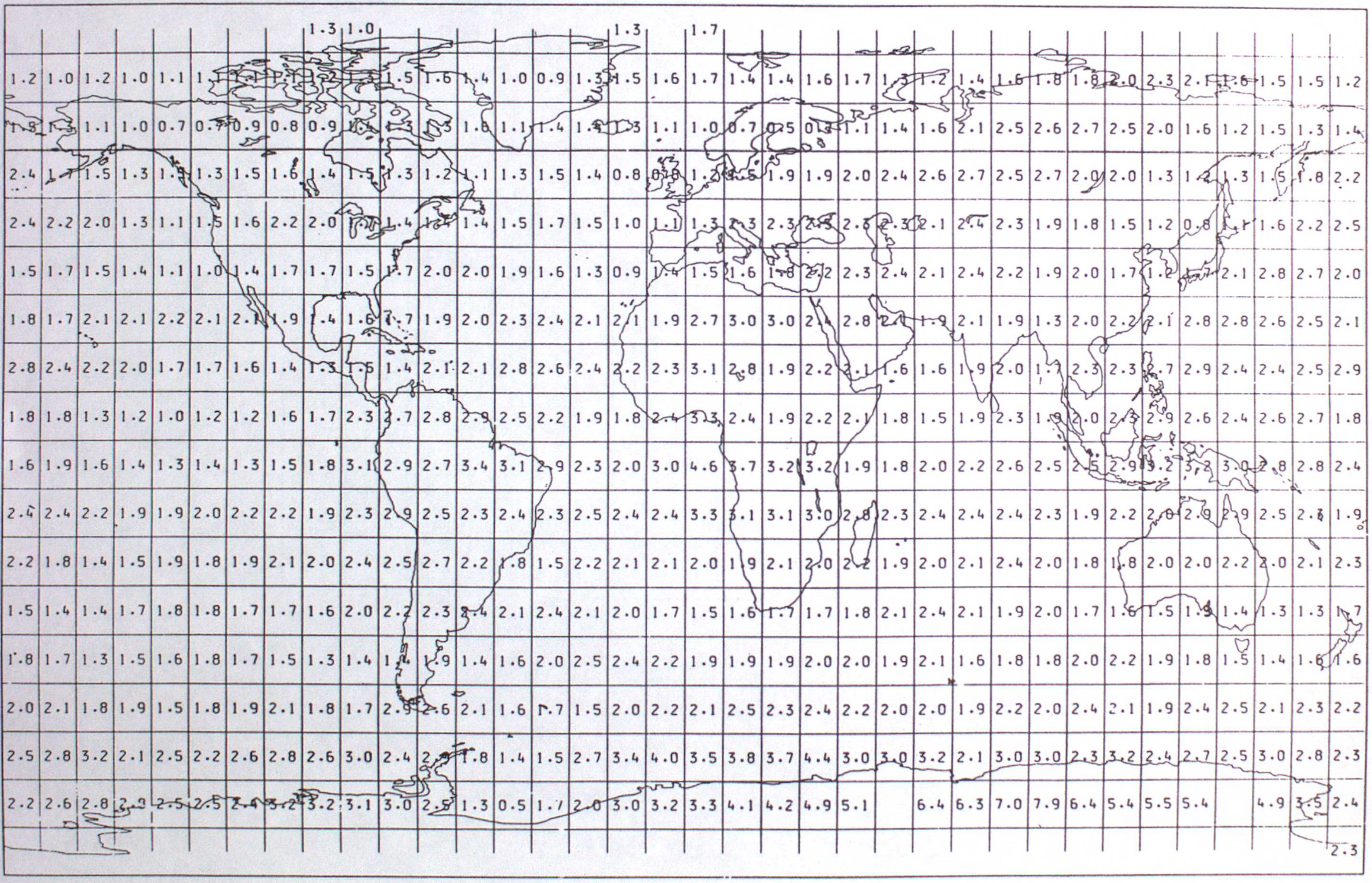

0.3 0.1 -0.1 0.1
0.5 0.5 0.2 0.2 0.0 0.1 0.0 0.1 0.1 0.2 0.2 0.5 0.2 0.8 0.7 0.6 0.6 0.5 0.6 0.2 0.4 0.4 0.3 0.3 0.4 0.2 -0.1 0.1 0.2 0.1 0.2 0.2 0.5 -0.3 0.5 0.4
-0.1 0.0 -0.2 -0.1 -0.3 0.1 0.0 0.2 0.1 0.0 -0.0 0.3 0.3 0.7 0.9 0.4 0.5 0.2 -0.3 -0.5 -0.3 -0.4 -0.4 -0.3 0.2 -0.1 0.0 0.1 -0.1 0.0 -0.1 -0.1 0.5 0.7 0.6 0.5
0.5 0.3 0.2 -0.1 -0.3 -0.2 0.0 -0.2 0.2 0.2 0.1 -0.1 0.1 0.1 0.2 0.1 0.0 -0.1 -0.3 0.4 -0.2 -0.3 -0.5 -0.5 -0.2 0.1 -0.1 -0.1 0.3 0.3 0.5 0.6 0.3 0.5 0.6 0.3
0.4 0.5 0.3 0.3 0.1 -0.2 -0.1 0.2 0.2 0.3 0.4 0.1 0.1 0.3 0.2 0.0 0.1 -0.2 -0.5 0.2 0.2 -0.2 -0.1 -0.4 0.2 -0.2 -0.1 0.3 0.3 0.4 0.3 0.5 0.5 0.3 0.7 0.4
0.4 0.5 0.4 0.4 0.1 0.1 0.1 -0.1 0.3 0.7 0.6 0.4 0.3 0.2 0.2 0.4 0.4 0.4 0.5 0.2 -0.1 -0.4 -0.2 -0.1 -0.3 -0.9 -0.3 -0.3 -0.3 -0.1 0.0 -0.1 0.1 -0.1 0.0 0.0
0.2 0.2 0.1 0.1 0.3 0.1 0.1 0.3 0.4 0.6 0.4 0.4 0.3 0.3 0.2 0.3 0.2 0.1 -0.1 -0.4 -0.6 -0.4 -0.1 0.1 -0.2 -0.1 0.2 0.6 0.5 0.4 0.0 0.0 -0.1 0.1 0.2 0.2
0.5 0.3 0.3 0.4 0.4 0.3 0.4 0.4 0.5 0.6 0.6 0.5 0.5 0.4 0.5 0.4 0.3 0.3 0.2 0.3 0.3 0.2 0.1 0.2 0.4 0.4 0.4 0.5 0.7 0.4 0.4 0.4 0.1 0.2 0.3 0.3
0.3 0.3 0.2 0.2 0.4 0.4 0.2 0.1 0.3 0.2 0.3 0.3 0.2 0.3 0.2 0.1 0.2 0.0 0.0 0.4 0.4 0.1 0.1 0.1 0.2 0.2 0.3 0.3 0.5 0.4 0.3 0.3 0.2 0.2 0.1 0.1
0.3 0.2 0.3 0.4 0.3 0.4 0.3 0.1 0.1 0.2 0.4 0.3 0.4 0.3 0.2 0.1 0.1 -0.2 -0.2 0.3 0.2 0.1 0.1 0.1 0.1 0.2 0.3 0.5 0.4 0.4 0.4 0.2 0.2 0.2 0.1 0.3
0.2 0.3 0.2 0.4 0.3 0.3 0.3 0.1 0.0 0.0 0.5 0.8 0.7 0.5 0.5 0.3 0.2 0.0 -0.4 0.0 0.0 0.1 0.1 0.2 0.2 0.2 0.1 0.2 0.3 0.1 0.1 0.0 0.1 0.0 0.1 0.3
-0.1 0.0 0.2 0.2 0.3 0.3 0.2 0.2 0.1 0.1 0.3 0.6 0.6 0.4 0.5 0.5 0.4 -0.1 -0.1 0.1 0.1 0.4 0.2 0.1 0.1 0.1 -0.1 -0.1 -0.1 0.0 0.2 0.2 0.3 0.3 0.2 0.0
0.7 0.2 0.3 0.1 0.1 0.4 0.5 0.2 0.3 0.4 0.4 0.0 0.4 0.4 0.4 0.4 0.5 0.1 -0.2 0.2 0.5 0.3 0.0 -0.2 -0.1 0.3 0.3 0.1 0.1 0.4 0.1 0.3 0.6 0.8 0.8 0.7
0.4 0.5 -0.1 0.0 0.0 0.3 0.0 0.2 0.1 0.1 0.6 0.5 0.6 0.7 0.7 0.5 0.2 0.3 0.9 0.7 0.7 0.4 0.3 0.0 0.2 0.5 0.3 0.3 0.1 0.0 -0.1 -0.1 0.0 0.1 -0.1 0.4
0.5 0.7 0.4 -0.2 0.1 -0.4 -0.4 -0.2 0.0 0.1 0.7 0.9 0.6 0.1 0.5 0.6 0.0 0.4 0.4 0.8 0.6 0.4 0.6 0.3 1.0 0.8 0.7 0.9 0.5 0.3 0.2 0.2 0.0 0.0 0.2 0.1
0.2 0.1 0.4 -0.2 -0.1 -0.1 0.2 -0.2 -0.1 0.0 0.4 0.3 0.2 0.1 0.1 0.2 0.2 0.3 0.3 0.3 0.1 0.5 0.4 0.2 0.2 0.7 0.8 1.3 0.9 0.7 0.4 0.6 0.0 -0.1 -0.4 0.3
-0.3 -0.2 0.0 0.2 -0.3 0.3 0.4 -0.5 0.5 0.7 0.7 0.7 0.4 0.0 0.4 0.1 -0.1 -0.3 -0.5 -0.3 -0.6 -0.6 0.2 0.5 0.2 -0.6 0.0 -0.3 0.5 1.1 1.2 0.4 0.0 -0.4
0.4

500 KM SATEMS : MEAN O-B TEMPERATURE DIFFERENCES (DEG C) : 30 TO 50 HPA

OCTOBER 1993 FIGURE 30

NOAA-12. USING ALL OBSERVATIONS

VALUES ARE PRINTED WHERE > 30 OBS ARE PRESENT



APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Table 4 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 4 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Table 5 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45